

# SOUTHERN POWER AND INDUSTRY

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JULY, 1954

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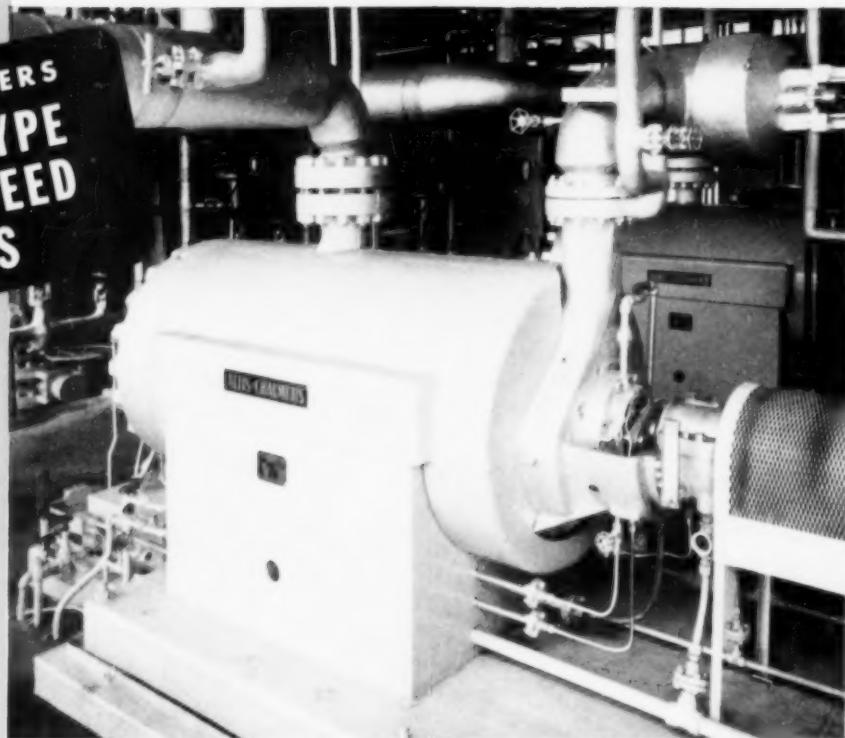
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BARREL-TYPE  
BOILER FEED  
PUMPS

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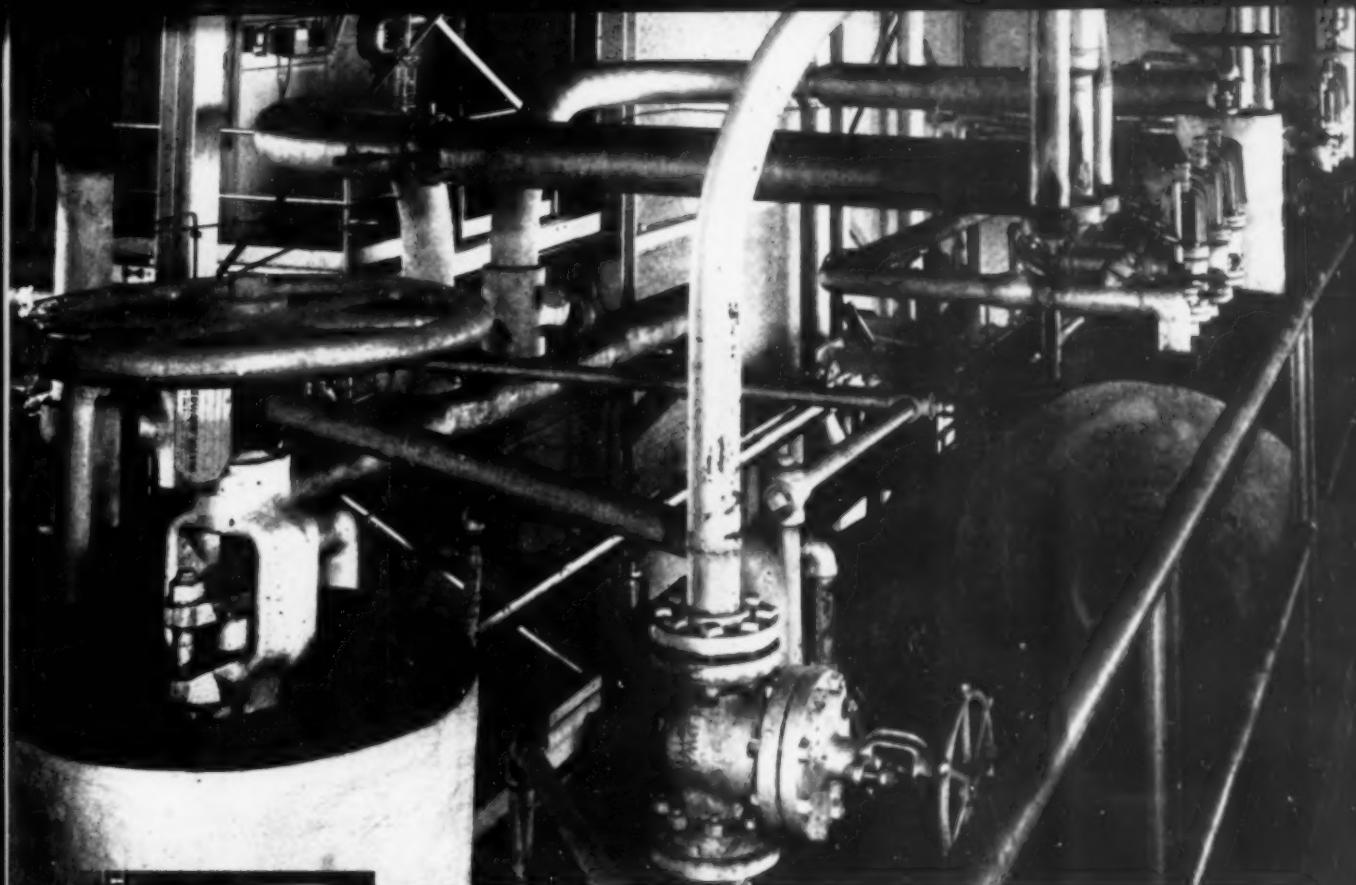
# ALLIS-CHALMERS

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Volume 72

Number 7





## How Edward Steel Valves Cut Maintenance in a Hospital 150 lb sp Boiler Plant

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Buying EDWARD 300 lb sp steel valves for 150 lb sp service proved a good investment at The Dr. Norman M. Beatty Memorial Hospital, Westville, Indiana.

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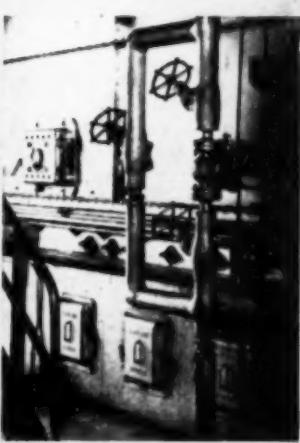
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The first of a series of case histories on the use of  
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"under 300 lb sp" service.



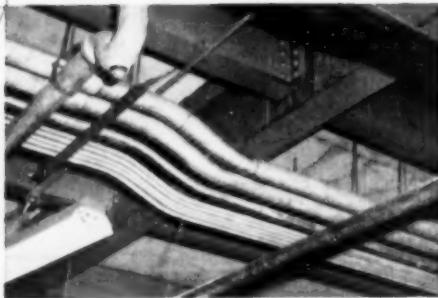


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# SOUTHERN POWER AND INDUSTRY

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1954

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# Facts and Trends

## **FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES**

July, 1954

- FIRST SOUTHEASTERN STATION with complete fire protection engineered "from-the-ground-up" is the Scholz Steam Plant of the Gulf Power Company in northwestern Florida. Modern equipment and methods are featured in this issue.

Only three extinguishing agents--carbon dioxide, chlorobromomethane and high pressure water fog are used at the Scholz plant. These have many very desirable characteristics and meet all the requirements for combating steam generating plant fires.

Portable carbon dioxide and chlorobromomethane units are used for the quick extinguishment of small fires. Fixed carbon dioxide systems protect the 2300 volt and 575 volt switchgear and also fight possible oil fires under the turbine by means of hose reel assemblies with cluster type nozzles. However, the real backbone of defense is the HIGH PRESSURE WATER FOG SYSTEM.

- POWER TRANSMISSION--Interesting new product is the Poly-V-Belt, a single, endless rubber belt with a series of parallel V ribs molded lengthwise around the inside circumference. Drive reduces face pressure one half, giving longer life to belt and sheaves. The Raybestos-Manhattan product eliminates belt matching problems common to multiple V-belt applications and gives equal horsepower in 1/3 less width or up to 50% more horsepower in the same width.
- ALUMINUM CABLE ADAPTER makes possible interchangeable use of aluminum and copper electrical conductor in switch and control equipment. Applications include meter enclosures and connecting cable to exposed pole-line equipment, such as transformers, cutouts, and capacitors.

In addition to providing efficient electrical and mechanical joints, the Thomas & Betts right-angle type cable adapters are compact; save space in the enclosure. It is unnecessary to bend bare cables at right angles to connect them to clamps.

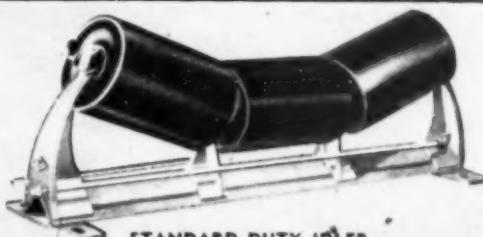
- AN ELECTRONIC COMPUTER will automatically calculate the cost of power delivered by each station in the complex Southern Company System. After fuel costs at each station have been set on the computer, the electronic brain takes into account transmission losses and generating costs in arriving at the ultimate cost of delivered power.

The Leeds & Northrup computer uses actual generation values that exist at any instant as provided by telemeters. Hence the cost of power delivered from any particular generating station is based on actual operating conditions.

- LIFT-SLAB RECORD--Largest project to date is the new 5-story dormitory at Clemson College, South Carolina. Concrete for the floors was

(Continued on page 6)

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*Continental*  
**IDLER**  
**for every purpose**



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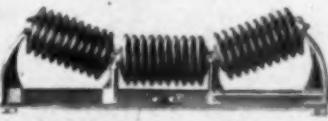
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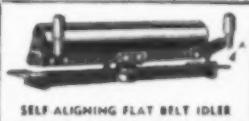
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FLAT ROLL



RUBBER DISC IMPACT IDLER



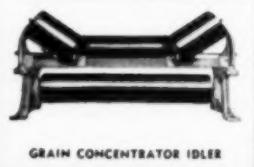
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FLAT BELT IDLER



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ENGINEERS



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MANUFACTURERS

## **facts and trends (continued from page 4)**

poured in separate layers at ground level about structural steel columns spaced about 25 ft. apart. Floors were then lifted by hydraulic jacks to final height and secured to columns. Daniel Construction Company utilized the lift-slab method to meet rigid time and cost factors.

Vacuum process to remove excess water from freshly poured concrete cut curing time, enabled finishers to begin work within 30 min. after pouring. Over 8,000 sq ft of slabs were lifted in unison at rates up to 12 ft per hour. Contractors anticipate savings of \$1 per sq ft.

- RECORDING CONTROLLER DESIGN by G.E. features magnetic standard which eliminates several components used in conventional recording systems --dry cells, slide-wires and moving contacts. Resultant savings in reduced maintenance costs can be substantial, particularly in multi-instrument installations.
- SILICON TRANSISTORS are now being commercially produced by Texas Instruments Incorporated in Dallas. By using silicon instead of germanium, the initial commercial silicon transistor immediately raises power outputs and doubles operating temperatures.

Until now, the greatest disadvantages of transistors have been their performance variation with temperature change and their low power outputs. Previous production units have used germanium. Silicon has been known to possess superior temperature stability and power handling characteristics. But up until now, purifying and fabricating difficulties have kept them laboratory devices.

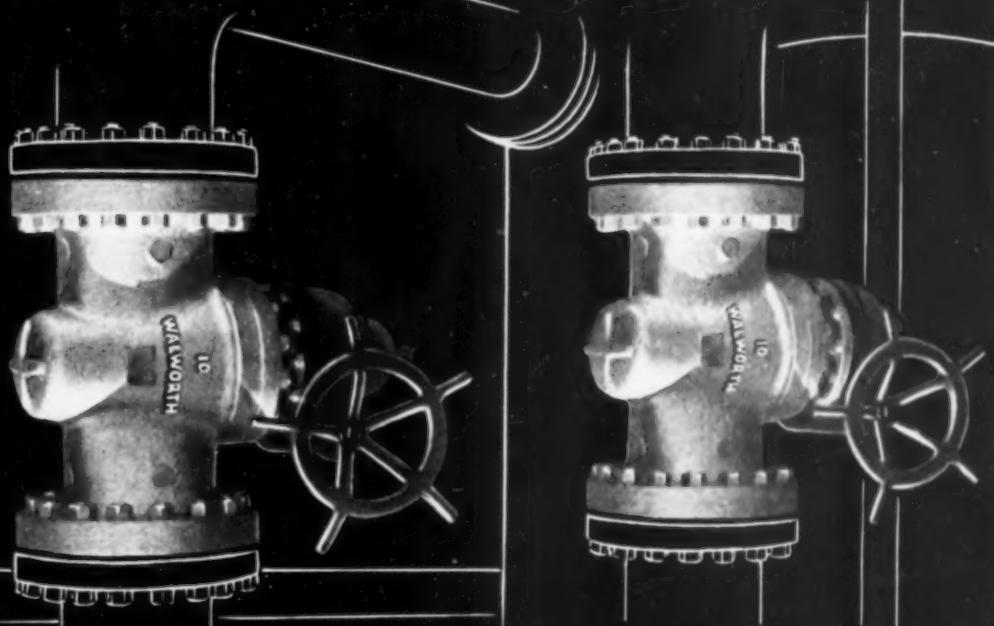
- UNFIRED PRESSURE VESSELS of aluminum alloy A54S will be fabricated of the strongest commercially available (Alcoa) non heat-treatable aluminum alloy ever offered. Aluminum offers exceptional corrosion resistance, high reflectivity, non-sparking characteristics, high thermal conductivity, and light weight. Lack of product contamination and corrosion resistance are the two big advantages in the pressure fabricating vessel picture.
- INDUSTRIAL TAPE DEVELOPMENTS--Brady Company's Self-Sticking PIPE MARKERS applicable at continuous temperatures from -33 to 300 F and intermittent temperatures to 450 F . . . Labelon's pressure-sensitive tape ADHERES TO OILY as well as to dry metal surfaces (special adhesive combines with oil to produce a firm bond, yet permits the tape to be stripped off any time without leaving a mark) . . . and Tapecoat, a COAL TAR PROTECTIVE COATING in handy tape form easily applied with the use of a torch to bleed the coal tar coating for an excellent bond.
- CONCRETE PROTECTION--By substituting a latex emulsion binder for much of the water normally used in cementitious mixes, the wearing qualities of concrete, mortar and plaster surfaces can be improved. Surco, a product of Surface Coatings, Inc., is claimed to do the job.

Compound increases resilience, water resistance and elasticity. Georgia Tech did the research work with Goodyear Tire & Rubber Company's Fliolite. Applications include covering floors, acid resistant tanks, making plaster waterproof, etc. Since a section of the Georgia Tech football stadium was covered with Surco last year, cracks and erosion by years of exposure have been eliminated.

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Write the editors for additional information on any of the above items.  
SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

# W A L W O R T H



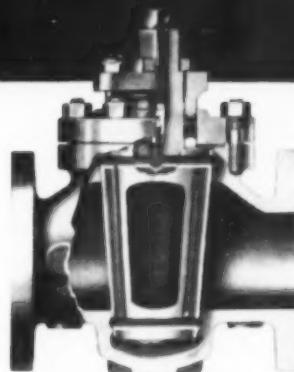
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*Better because ...* They are pressure sealed with an insoluble lubricant readily renewed while the valve is in service. Lubricant completely surrounds the plug ports assuring a tight seal against leaks. It also insures ease of operation by reducing friction between the body and the plug while at the same time protecting the finished surfaces against corrosion and wear.

Walworth Lubricated Plug Valves are the most satisfactory valves available for the handling of gritty suspensions, and many other destructive, erosive, and corrosive industrial and chemical solutions.

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Lubricant system of a Walworth No. 1700F Regular Gland, Wrench Operated, Steel-iron, Lubricated Plug Valve. Other Walworth Lubricated Plug Valves include Single Gland, and Ball Bearing types. Sizes to 30-inches — pressures to 5,000 psi, and for vacuum service.

# WALWORTH

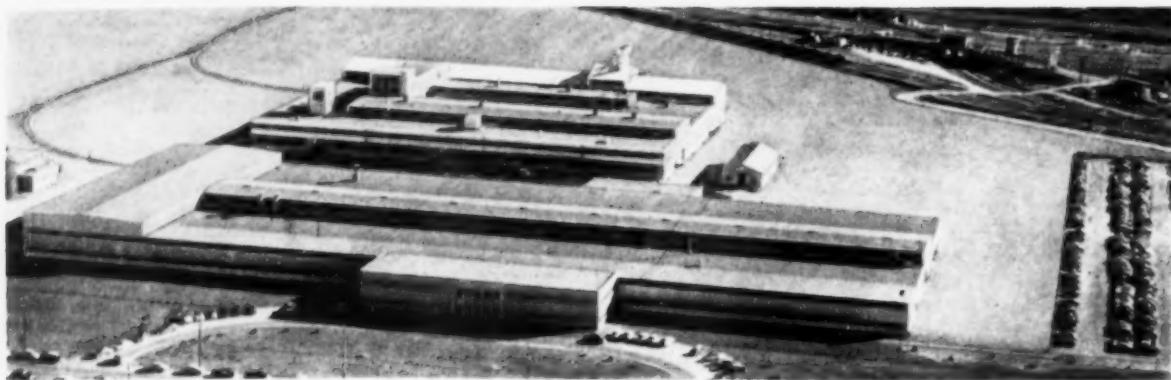
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valves . . . pipe fittings . . . pipe wrenches

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# NEWS for the South and Southwest



## New Fairbanks-Morse Pump Works—Kansas City

The new Kansas City Pump Works of FAIRBANKS, MORSE & CO., Chicago manufacturing firm, was formally dedicated and opened to the public late in May.

Geared to an annual output of enough pumps to move 35 billion gallons of water or other fluids per day, the new plant includes one of the nation's most modern foundries and a manufacturing department which occupies 180,000 sq ft.

Taking part in the formal ceremonies were ROBERT H. MORSE, JR., president; JOHN R. WALSH, plant

manager; MAYOR CLARK E. TUCKER of Kansas City, Kansas, and LEONARD E. BURCH, president of the local Chamber of Commerce.

The 38½ acre site was selected because of this area's central location. When the works is in full operation an estimated 900 persons will be employed as follows: manufacturing department—425; foundry—200; office—150; maintenance—75, and administrative—50.

Types of pumps made at Kansas City are those described technically as built-togethers, side suction, trash,

angle flow, split case, and steam and power reciprocating. Sizes range up to and include those which will handle a 16-inch flow. Also manufactured in the plant are "Z" engines which range from two to 30 horsepower.

### Foundry

The completely mechanized foundry, with its towering cupolas, three-story core furnaces, large electric furnace and pipes that blow sand from one location to another as though it were a fluid, is able to turn out 82 tons of castings a day. The foundry occupies 147,600 square feet.

### Manufacturing Department

The manufacturing department is



ELECTRIC FURNACE will hold 11 tons of molten iron at desired temperatures and will melt two tons per hour.



LARGE PUMP assembly line rounds the corner and stretches away toward the testing floor. Workers assemble a large variety of pumps on this conveyor, mounting Fairbanks-Morse motors to many of them.

# Cities Service views one small corner of its vast estate...



Eleven million acres of prospective oil and gas lands in the United States and Canada—in addition to holdings in South America, Egypt, and the Middle East—are under lease or owned outright by

**CITIES  SERVICE**

*A Growth Company*

## News for the South and Southwest (continued)

equipped with two overhead cranes, each with a 13-ton capacity, and three pendant, or floor-operated, three-ton cranes and numerous smaller lifts to speed production. Twelve gas-operated fork-lift trucks handle the palletized materials and products.

### Laboratories

There are two test laboratories, located in the center of the manufac-

turing department, where all pumps are checked for performance before being shipped to customers. One of the laboratories is used for testing pumps up to 10-inch capacity and the other, which will be used mainly for experimental work, can test pumps up to 16-inch capacity.

### Offices

A two-floor office section occupies

18,000 square feet in the front of the manufacturing department building and provides the ultimate in well-lighted, well-ventilated modern office space. Main offices are production, engineering, accounting, process engineering, and the pump sales division.

Activities were highlighted by an industry-wide forum on problems arising from the increased demand for water in the United States and related problems in the research and development of pumps and the general field of hydraulics.

Taking part in the forum were leaders in the field from both the practical and academic side. Chairman of forum activities was DEAN FRANCIS M. DAWSON of the State University of Iowa College of Engineering, and heading the panel section of the program, which consisted of seven members, was DR. ROBERT T. KNAPP, professor of hydraulic engineering, California Institute of Technology. Other speakers included DR. RICHARD G. FOLSOM, director and head of research, Engineering Department, University of Michigan, and GAIL A. HATHAWAY, past-president of the American Society of Civil Engineers and at present special assistant to the Chief of Engineers, Department of the Army.

### Deaderick Company Sponsors Atlanta Machine Tool Show

The recent three-day MACHINE TOOL SHOW, sponsored by the R. O. DEADERICK COMPANY of KNOXVILLE, TENNESSEE and ATLANTA, GEORGIA, featured operating exhibits of 13 leading machine tool manufacturers. Show was held May 19, 20, and 21 in the Exhibition Hall of the Biltmore Hotel in Atlanta, Georgia.

RICHARD O. DEADERICK is president of the sponsoring firm; ROBERT W. FULTON is vice-president and Atlanta office manager.

Special interest was drawn to the show since federal tax law revisions before Congress promise to allow faster depreciation on industrial machinery. Previous long-term depreciation requirements often have deterred industries from replacing obsolete equipment. Since technological advances have been especially rapid in the machine tool field, the result has been a high degree of obsolescence.

Shorter write-off periods are expected to be an impetus to quicker modernization and "tooling up" of industry. This makes the industrially booming South all the more attractive as a machine tool market.

Because the South's industrial boom is young, the ratio of obsolete machine tools is lower. On the national average 55% are 10 years old or older, and 19% are more than 20 years old. For the South the corresponding figures are 50 and 14%. Yet the South today averages only 21.4 machine tools per 100 employees as compared with a national average of 33.3.

That there has been a big expansion in the South, however, is indicated by available figures. Between 1940 and 1953 the gross sales of Southeastern metalworking plants increased by 283%. Moreover, last year 57% of these plants were planning expansion within five years involving an estimated total investment of \$200,000,000.

OPERATING EXHIBITS included lathes, drills, millers, duplicators, automatic screw machines, grinders, presses, bending rolls, routers, etc., of American Tool Works, Avey Drilling, Bridgeport Machines, Covel Manufacturing, DeFleig Machine, Gisholt Machine, Grab Brothers, Nebel Machine Tool, Niagara Machine & Tool, Sheldon Machine, Turchan, and Van Norman. Cone Automatic also showed a color film on its automatic screw machine.



### FUTURE EVENTS

#### Of Engineering Interest

**APPALACHIAN GAS MEASUREMENT SHORT COURSE**, R. E. Hanna, Jr., Chm. Housing & Registration, West Virginia University, Morgantown, W. Va.  
Aug. 23-25, 14th Annual Session, West Virginia University, Morgantown, W. Va.

**INSTRUMENT SOCIETY OF AMERICA**, Mg. Dir., First International Instrument Congress & Exposition, 845 Ridge Ave., Pittsburgh 12, Pa.  
Sept. 15-21, First International Instrument Exposition, Philadelphia Convention Hall, Philadelphia, Pa.

**PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS**, Robert W. McKinnon, Exec. Sec'y, 5 Franklin Road, Roanoke, Va.  
Sept. 16-18, Thirty Sixth Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

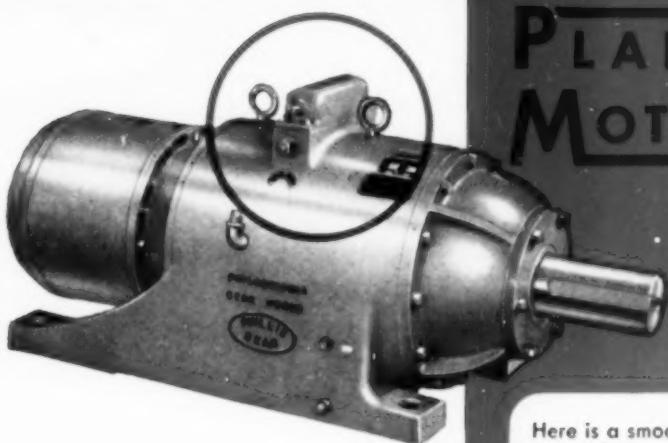
**AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS**, Harold M. Furtney, Chm., Tulsa Section, 1610 E. 32nd Place, Tulsa 5, Okla.  
Sept. 27-29, Electrical Conference for the Petroleum Industry, Mayo Hotel, Tulsa, Okla.

**PETROLEUM ELECTRIC POWER ASSOCIATION**, W. L. Pearson, Sec'y-Treas., P. O. Box 1261, Amarillo, Texas.  
Oct. 4-6, Twenty-Sixth Anniversary Meeting, Jung Hotel, New Orleans, La.

**SOUTHERN TEXTILE EXPOSITION**, Miss Bertha Green, Sec'y, Textile Hall Corp., Greenville, S. C.  
Oct. 4-8, Eighteenth Southern Textile Exposition, Textile Hall, Greenville, S. C.

**Continued—page 94**

**.. FOR INSTANT OVERLOAD PROTECTION**



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For catalogs or detailed information, write Virginia Gear  
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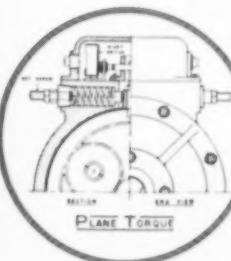
## PLANETORQUE MOTOREDUCER

... eliminates  
shear pins,  
electrical relays ...

Here is a smooth running, trouble-free Motorized Speed Reducer . . . an "exclusive" product, whose design and construction is the result of 61 years of gear making and speed reducer experience. Built in two types, Horizontal and Vertical. The MotoReduceR has many original, outstanding advantages, each of practical value to industry:

- Planetary gear design provides better alignment of pinions and gears, which in turn reduces noise and wear.
- Permits greater reduction ratios in more compact unit than otherwise possible.
- Reducer can be readily disassembled for easy inspection or maintenance.
- Vertical units incorporate "dry well" construction, which eliminates possibility of oil leakage down output shaft.

### PLANETORQUE



PLANETORQUE is a feature that can be supplied with any Philadelphia MotoReduceR or Philadelphia Planetary Reducer. It safeguards both the driven machinery and drive unit from dangerous overloads. These units are widely used on stoker drives, conveyor drives, mixers, agitators, roll drives, and tumblers, where overloads or jamming may be encountered.

For further detailed information write for Planetorque MotoReduceR Catalog.

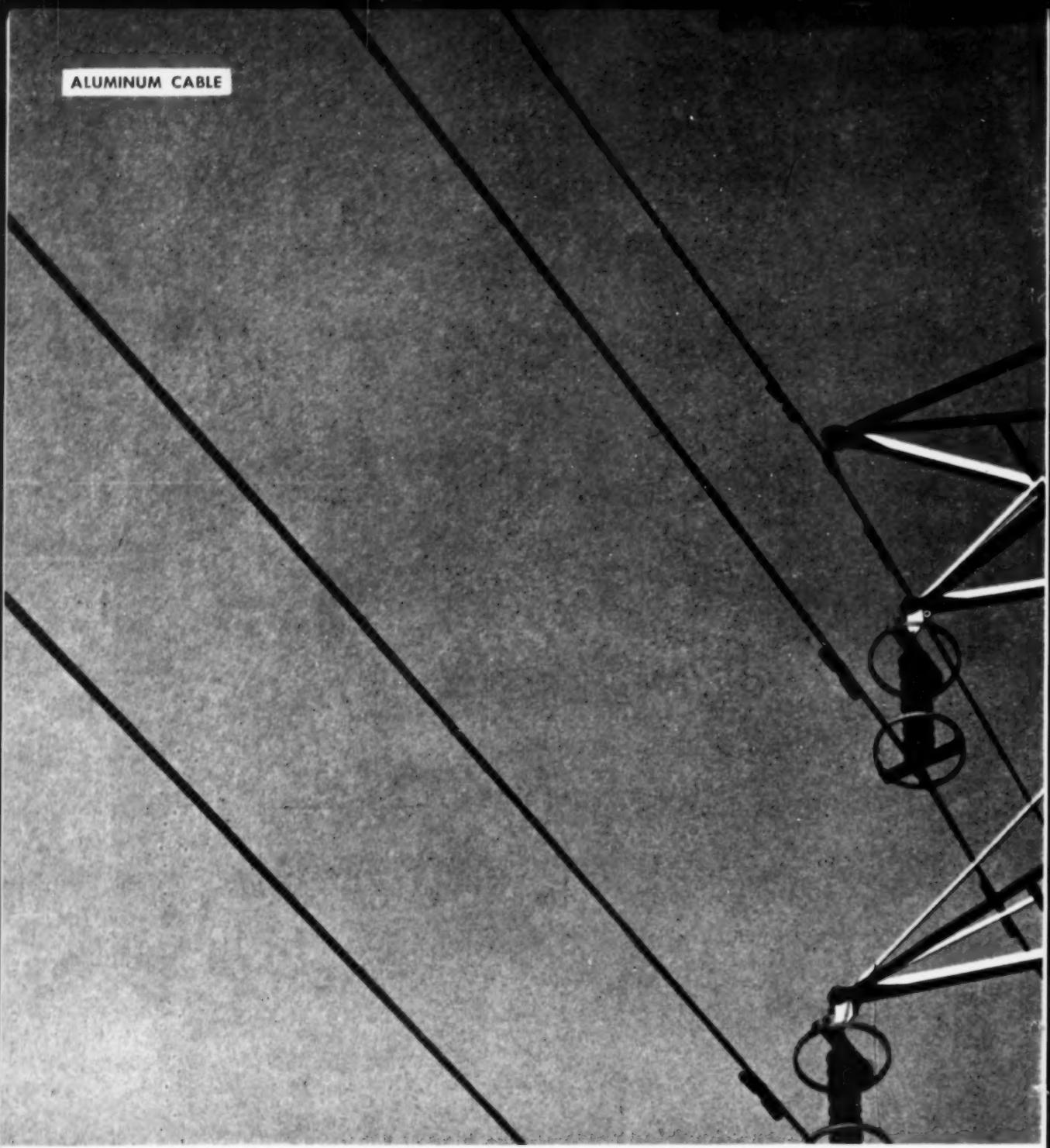
# Philadelphia Gear Works, Inc.



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NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

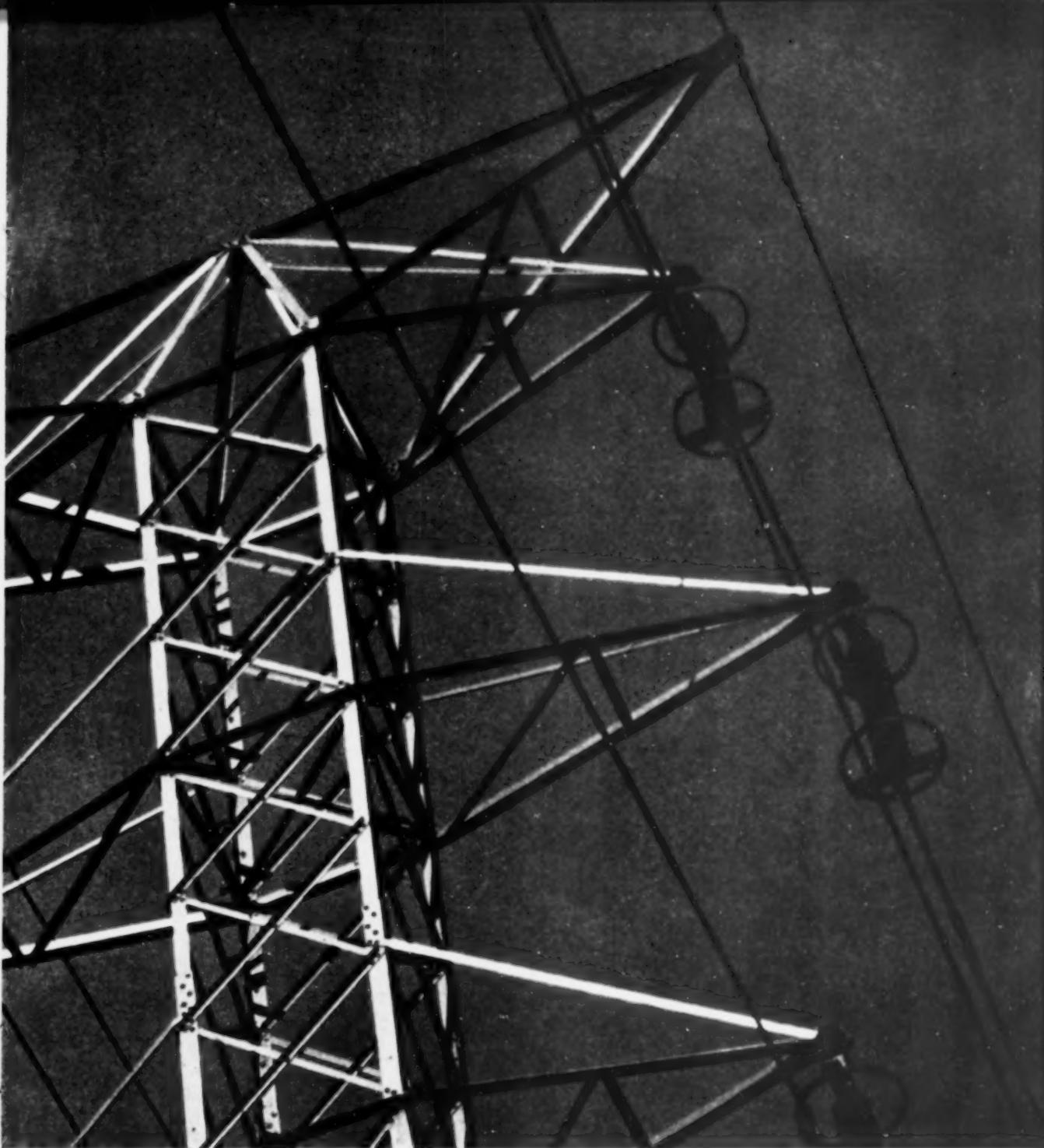
Industrial Gears and Speed Reducers  
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ALUMINUM CABLE



Anaconda Recipe for ACSR...

**Aluminum, Steel...AND CABLE EXPERIENCE**



**ANYONE** can put Aluminum and Steel together!

But do you get what you want?

At Anaconda, we add still another prime essential — cable experience!

Not everyone has it. Cable experience takes *years* of "on the job" cable design, metallurgical research and manufacturing "know-how."

Such experience comes only from *living with* the problem.

We use this plus quality — cable experience — and

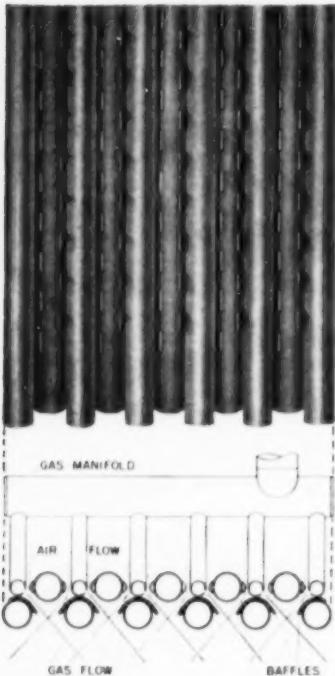
the very latest equipment to make the finest cable.

And we manufacture and stock aluminum in 5 strategically located mills to assure you of quick, sure delivery. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

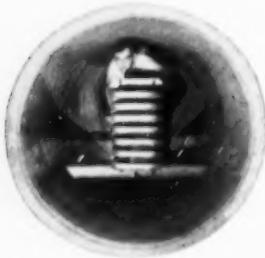
**ANACONDA<sup>®</sup>**

*Copper and Aluminum insulated conductors • Copper and Aluminum service cable • Wire and Cable accessories • ACSR transmission and distribution • Copper, Aluminum and Copperweld bare and weatherproof wire.*

# Modern... Outdoors...



Section of Riley Intertube Burners shows tube arrangement and baffles. Drawing illustrates how gas pipes are protected by water tubes while baffles welded to front tubes assure positive and uniform mixing of gas and air.



View of lower boiler drum open at ends showing Riley submerged type heat exchanger.

Two new Riley pressurized furnace steam generating units, installed in a Texas chemical plant are operating at high efficiency. The design is completely modern in concept: induced draft fans have been eliminated, new Riley Intertube Burners for firing natural gas are used for the first time, and special considerations have also been made to insure low cost, clean steam from feedwater high in solids and silica content.

## **A Few of the Outstanding and Exclusive Riley Design Features of these Twin Riley 200,000 pounds per hour Pressurized Furnace Units**

- Insulation over an all-welded inner casing is "plasticized" to resist weathering.
- All waterwall tubes are welded to stub tube ends in headers, not rolled.
- Compact design of hot and cold air ducts permits low cost installation of forced draft fans.
- New Riley Intertube Burners for firing natural gas make possible low excess air and also do away with exposed burner refractory, resulting in complete elimination of furnace refractory maintenance.
- "Wall of Flame" characteristic from this new Riley burner provides unusual uniformity of heat distribution across furnace with uniform heat absorption across superheater.
- The effectiveness of the Riley Condenser Type Steam Purifier in main steam drum produces the unusual steam purity of only 0.33 ppm solids and 0.010 ppm silica in spite of boiler water concentration as high as 4000 ppm solids and 94 ppm silica.
- A submerged type Riley heat exchanger in lower drum provides constant steam temperature over a wide load range.

When steam generating equipment must be "tailored" to meet specific requirements, you too will find Riley engineers thoroughly qualified to fill your needs. A survey of your power plant requirements by a consulting engineer will possibly show you ways of making surprisingly large savings in your power costs.

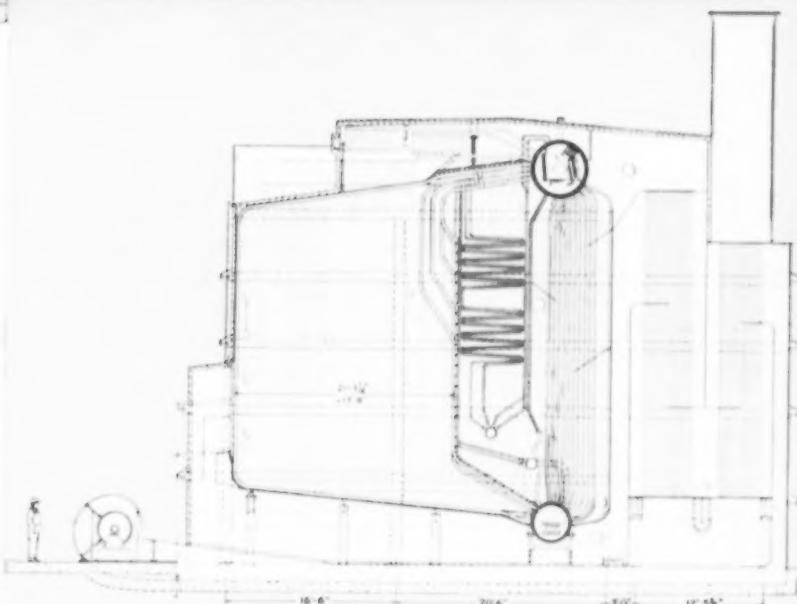
# ...Pressurized!



This completely outdoor plant has Riley gas burners and f-d fans at front wall of boiler. Control room, center, is the only enclosed part of plant. Operators have clear view of all auxiliaries in 40' wide aisle between boilers, also of turbines at left of control room. Note absence of structural steel.

## ENGINEERING DATA

**Maximum Continuous Capacity**—each unit—200,000 lbs./hr.  
**Design Pressure**—1075 psig  
**Operating Pressure**—1000 psig  
**Superheater Temperature**—850°F  
**Furnace Volume**—10,000 cu. ft.  
**Furnace Height**—30'-6"  
**Furnace Width**—17'-8"  
**Furnace Depth**—21'-3 1/8"  
**Heat Release in Furnace Btu./cu. ft. hr.**—29,900  
**Riley Cross Flow Air Preheater**—  
 38,000 sq. ft. surface  
**Eight Riley Intertube Burners**  
**Efficiency**—each unit—83.1%



# RILEY

# L

# LEY

*Stoker Corporation*  
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**COMPLETE STEAM GENERATING UNITS**  
AND FUEL BURNING EQUIPMENT FOR PUBLIC UTILITIES, INDUSTRIAL POWER AND HEATING PLANTS

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*And How to Do It*

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Bulletin 483, 16 pages—Gives basic information regarding Vulcan automatic and automatic sequential soot blowing. Includes wide variety of typical installation drawings to show complete cleaning systems.—COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE CO.

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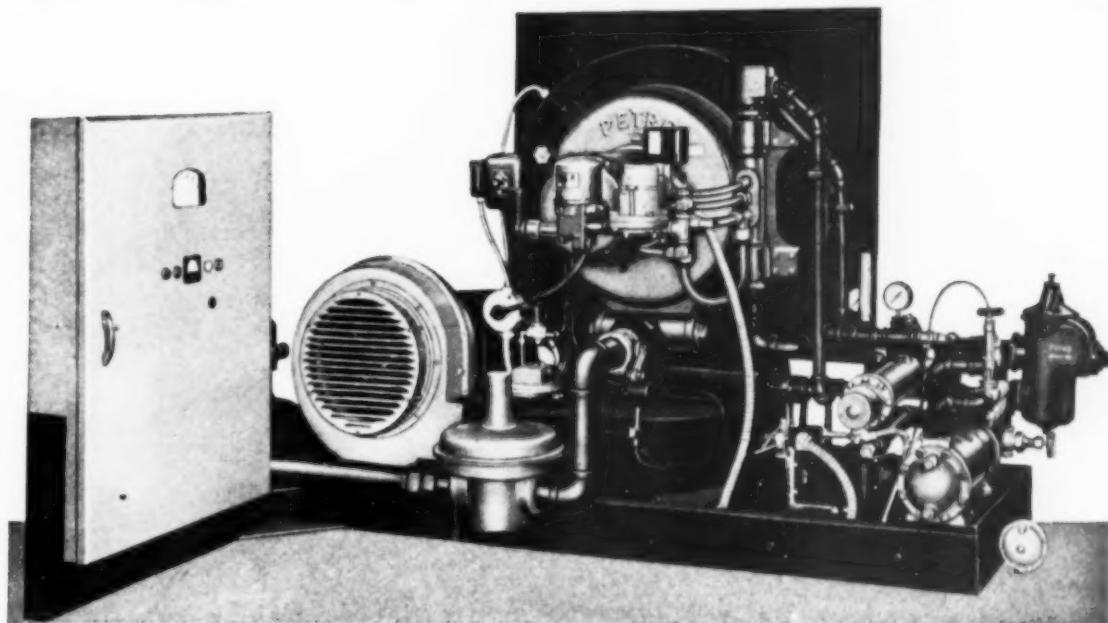
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OIL, GAS, OR OIL-GAS  
COMBINATION BURNERS**



*a perfectly balanced firing system...*

**FOR OIL . . .**

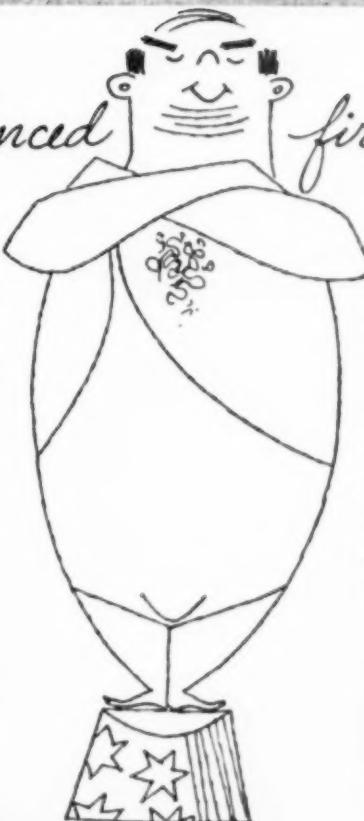
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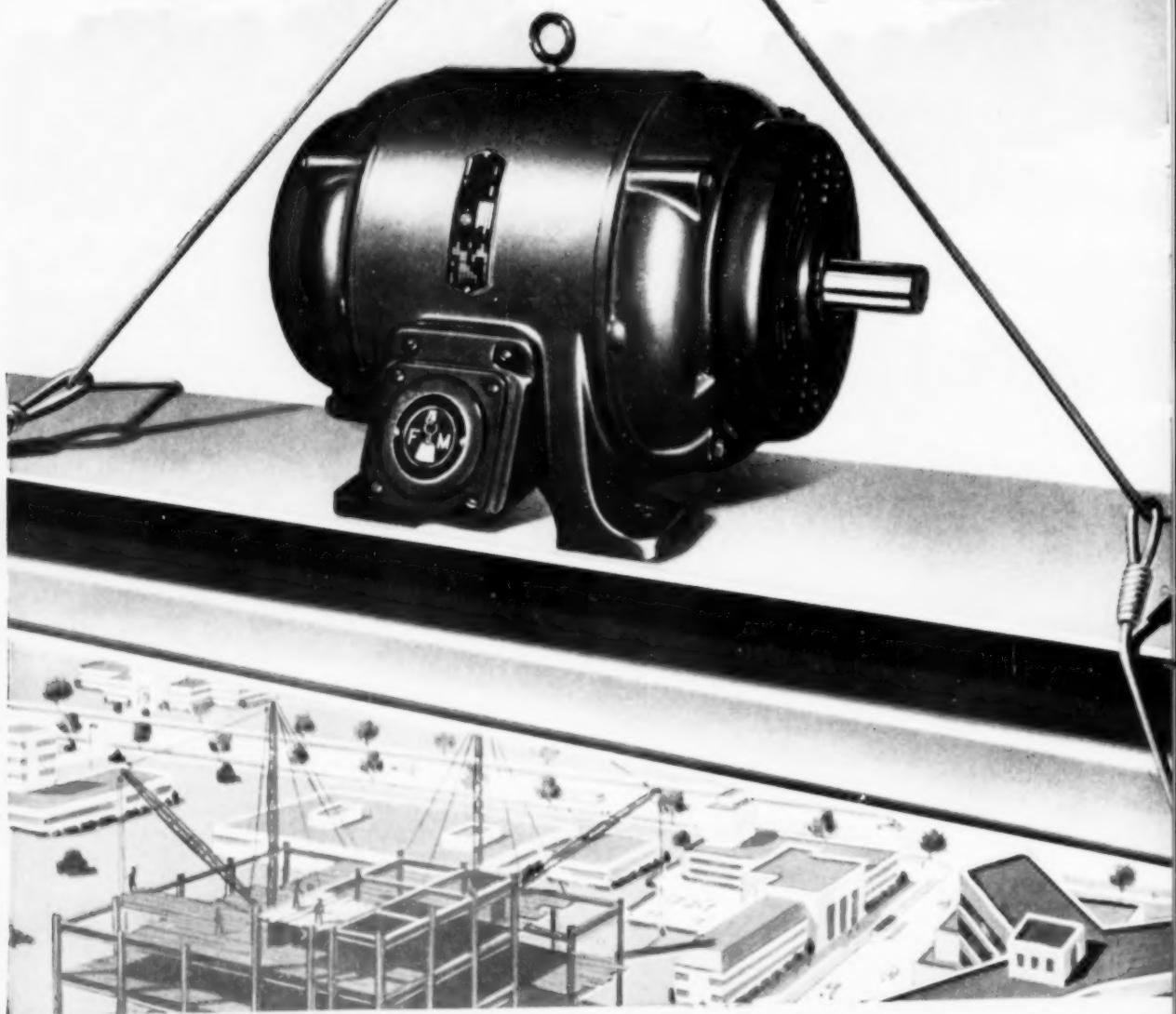
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Residential Oil and Gas Burners, Oil and Gas Furnaces and Boilers, Industrial and Commercial Oil, Gas and Oil-Gas combination Burners

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THE REG. U. S. PAT. OFF.  
OVER 50 YEARS OF LEADERSHIP IN AUTOMATIC  
HEATING AND POWER EQUIPMENT

# GOING UP...

Electric Motor



SOUTHERN POWER & INDUSTRY for JULY, 1954

# Performance!

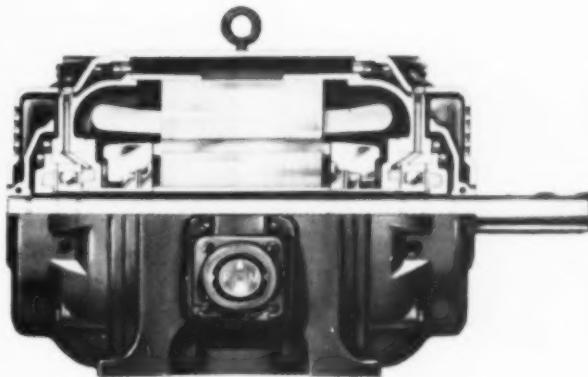
To a towering structure of design achievement Fairbanks-Morse adds still another outstanding member . . . a compact new enclosed motor . . . backed by an engineering tradition which has been a-building for more than a century.

That tradition is  
*More Performance in Less Space.*

You, as a buyer of electric motors, will benefit by that tradition . . . just as the users of Fairbanks-Morse diesel engines, pumps, scales, locomotives and the many other F-M products are today enjoying the advantages of finer performance.

Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Illinois.

## NEW FAIRBANKS-MORSE TOTALLY ENCLOSED FAN-COOLED MOTORS



**TOTALLY ENCLOSED**—Wherever adverse operating conditions are encountered, F-M totally enclosed construction effectively insures electrical parts and bearings against contamination by dirt, abrasive dusts, metal particles, corrosive gases and steam.

**DOUBLE-END VENTILATION**—Cooling air is drawn through guarded openings in both fan shields and uniformly circulated through cored passages surrounding the sealed inner shell. Efficient heat-transfer action insures uniform internal cooling. Exhaust air is discharged through bottom of frame—not across motor and driven machine.

**COPPERSPIN ROTOR**—Exclusive Fairbanks-Morse feature—an indestructible one-piece rotor—homogeneous, free from flaws for maximum strength and lifetime service.

**CONDUIT BOX**—New, gasketed, cast iron conduit box permits easy pulling of cables without insulation damage. Fairbanks-Morse exclusive: recess feature allows elimination of conduit box where space is limited.

**BEARINGS**—Precision ball bearings are effectively sealed against grease leakage and contain ample lubrication for extended periods of rugged service. Convenient means are provided for flushing and relubricating if desired. Cartridge bearing construction is standard on all larger ratings.

**FAIRBANKS-MORSE**

a name worth remembering when you want the best

ELECTRIC MOTORS AND GENERATORS • DIESEL LOCOMOTIVES  
AND ENGINES • PUMPS • SCALES • RAIL CARS • HOME WATER  
SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

# In 1879, it was the new “Wing’s Disc Fan”



It was 75 years ago that L. J. Wing, an ingenious Yankee who had come to New York with some ideas about mechanical devices, formed the company which later became the L. J. Wing Mfg. Co., for the purpose of manufacturing and selling "Wing's Disc Fan" which, according to his catalog, would "move more air than

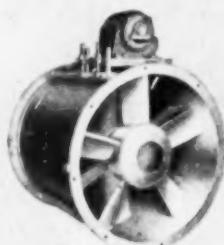
any other Fan made for heating, ventilation, drying, etc., as competitive trials have shown". Today, Wing products for ventilation, heating and combustion are known for their efficiency and dependability in all parts of the world. The company Mr. Wing founded has kept his ideals of originality and excellence constantly before them.



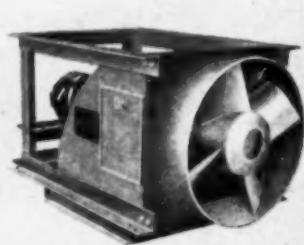
REVOLVING UNIT HEATER



UTILITY UNIT HEATER



Straight Line Duct Fan



ELBOW DUCT FAN

**today, Wing Fans, Blowers,  
Unit Heaters, Draft Inducers  
and Turbines are serving  
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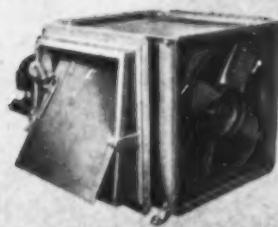
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MOTOR DRIVEN BLOWER



TURBINE BLOWER



DRAFT INDUCER



TURBINE

# "WE CUT OPERATING COSTS \$67,000 A YEAR— BY BURNING COAL THE MODERN WAY!"



This unretouched photo shows Bernheim's modernized power plant operating under full load. Three boilers now provide more steam than six boilers did before modernization. Automatic combustion controls have been installed. The increased efficiency has resulted in large fuel savings, virtually smokeless operation, and greatly reduced maintenance costs.

**Why not take full advantage** of coal's economy? Cut your operating costs to a minimum with automatic coal- and ash-handling equipment. Get more steam for every dollar with an up-to-date combustion installation.

Whether you're building a new plant, or planning to modernize, a consulting engineer can show you how you can get big savings by burning coal in a modern plant designed to meet your specific needs.

Consider, too, that of all fuels, coal alone has virtually unlimited reserves. And America's coal industry leads the world in efficient, economical production. That means that, unlike other fuels, ample coal will be available in the future—and at relatively more stable prices.

## If you operate a steam plant, you can't afford to ignore these facts!

**COAL** in most places is today's lowest-cost fuel.

**COAL** resources in America are adequate for all needs—for hundreds of years to come.

**COAL** production in the U.S.A. is highly mechanized and by far the most efficient in the world.

**COAL** prices will therefore remain the most stable of all fuels.

**COAL** is the safest fuel to store and use.

**COAL** is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

## BITUMINOUS COAL INSTITUTE

A Department of National Coal Association, Washington, D. C.

FOR HIGH EFFICIENCY • FOR LOW COST  
**YOU CAN COUNT ON COAL!**

# Powell LUBRICATED PLUG Valves

Now! A great new line of valves that maintain

the Powell  
standards of  
precision!

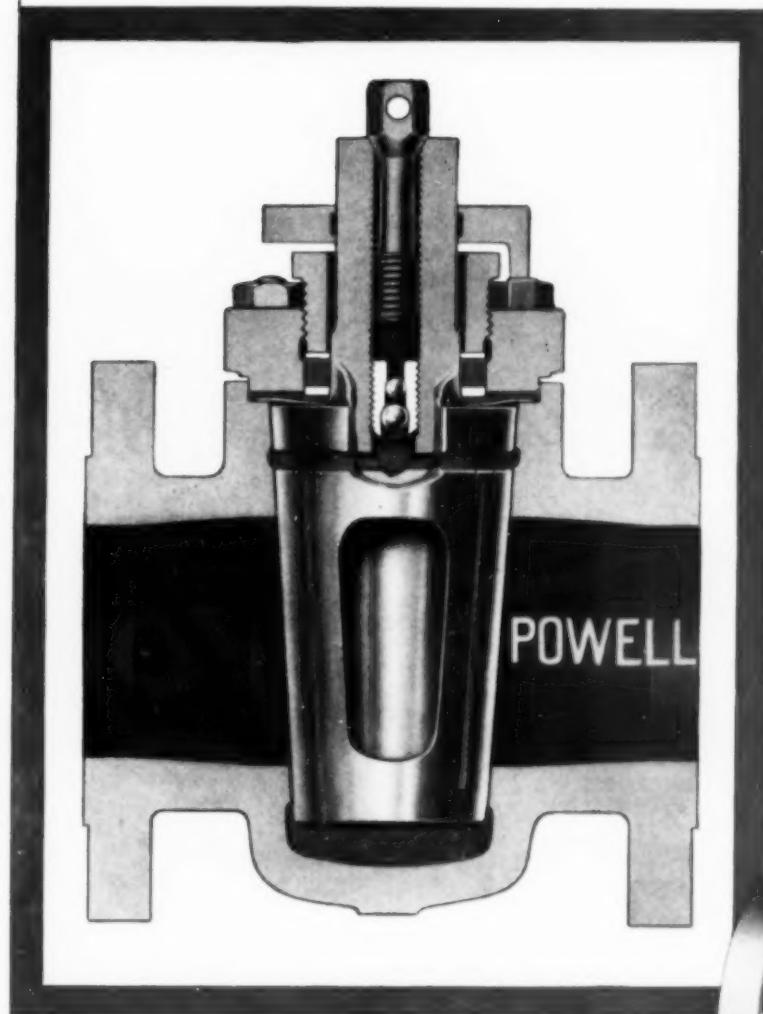
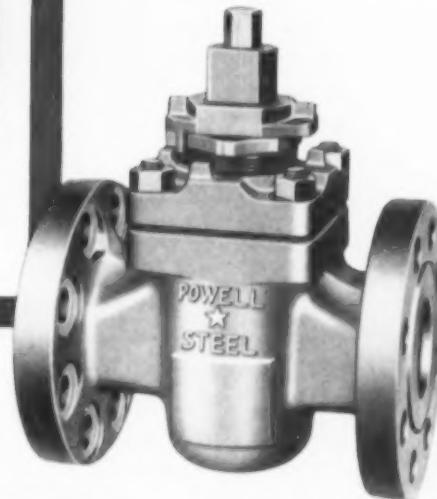


FIG. 1559 — 150-POUND STEEL FLANGED END LUBRICATED PLUG VALVE.  
(300-pound Steel, Fig. 3059.) Available with Screwed or Bolted Glands.  
Semi-Steel valves available for 175 and 200 pounds W.O.G. Carbon  
Steel valves available for 150 and 300 pounds W.P.

Investigate these outstanding new Lubri-  
cated Plug Valves that carry the Powell  
name and measure up to the Powell  
standards of precision. Features include  
quick and positive operation — just a  
quarter-turn to open or close. Lubricant  
grooves surrounding each port provide  
a positive seal when the valve is closed.  
In an open position, seating surfaces are  
not exposed.

Available in Semi-Steel and Carbon  
Steel through distributors in principal  
cities. For descriptive literature—or help  
on valve problems—write direct to The  
Wm. Powell Company, Cincinnati 22, O.



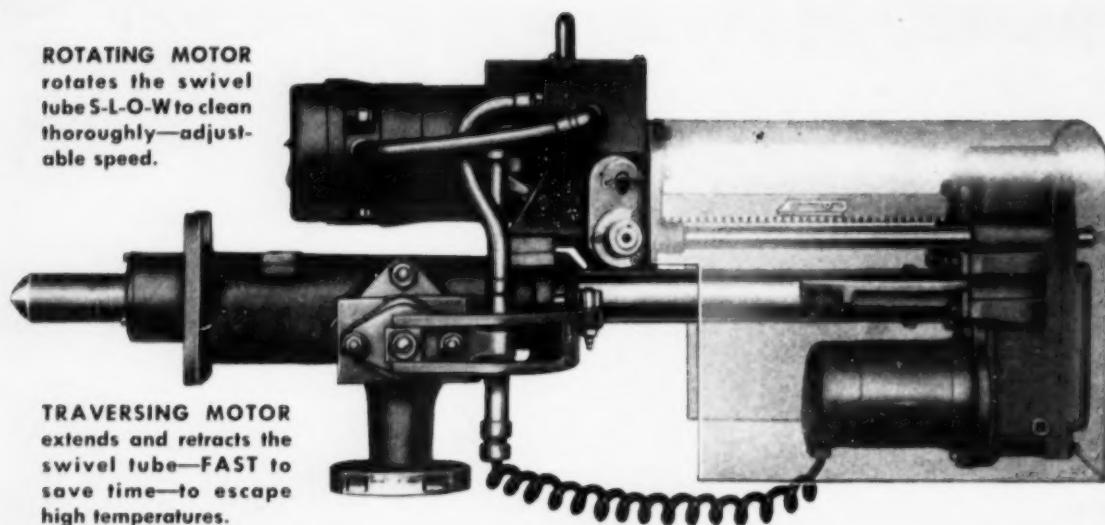
CONTROLS FOR THE LIFE LINES OF INDUSTRY

# Powell Valves

108th  
year

# How to STOP SLAG BUILD-UP

**ROTATING MOTOR**  
rotates the swivel  
tube S-L-O-W to clean  
thoroughly—adjustable speed.



**TRaversing MOTOR**  
extends and retracts the  
swivel tube—FAST to  
save time—to escape  
high temperatures.

**K**EEP slag and sintered dust from upsetting heat-transfer capacity and superheat or reheat control. Stop their build-up—quickly and effectively—with the high-power mass blowing and fast action of Vulcan Wall Deslaggers.

Thanks to dual-motor drive—electric or air, electric shown—a Vulcan Deslagger extends into the boiler, cleans and retracts from the high-temperature zone—all in 76 seconds. The cycle can be repeated often, if needed to control deposits.

Steam, air or water—or any combination of them—may be used as the blowing medium without change in equipment. The blowing or cleaning arc can be any angle up to a full 360 degrees.

## VULCAN *Dual-Motor Wall Deslaggers*

With direct-acting valve  
Clean BETTER and FASTER

The story is told in detail by new  
Bulletin 1016. Write for it.

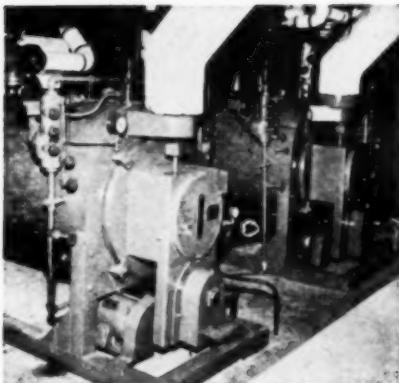
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CONTINENTAL FOUNDRY & MACHINE COMPANY  
ERIE 4, PENNSYLVANIA

**VULCAN**



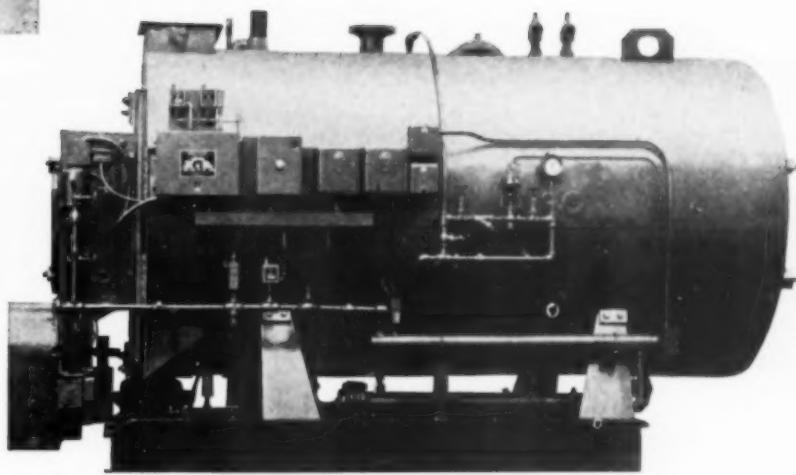
*Automatic  
Soot*

**BLOWERS**



# LOW COST STEAM with the Continental "Packaged Boiler"

**84.08% full load  
boiler efficiency...  
99.77% dry steam  
reported by  
engineering firm**



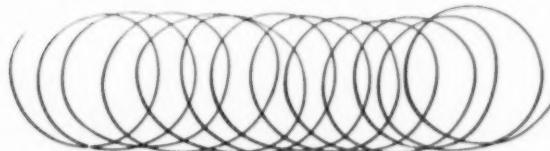
A consulting engineering firm conducted a test on a 150 hp Continental Automatic Boiler firing Bunker C Fuel Oil, under simulated field operating conditions in accordance with the A.S.M.E. boiler test code. The results give proof as to why Continental Boilers afford high steam quality and low fuel costs. As the test showed: steam quality was 99.77% dry . . . full load boiler efficiency was 84.08% . . . and stack temperature was considerably less than 100 degrees (F.) above steam temperature.

The consistently high efficiency and low stack temperature of the Continental Boiler are due mainly to ample heating surface, thorough mixing of atomized fuel and air, and the spinning gas technique.

**Continental Boiler Division  
BOILER ENGINEERING & SUPPLY CO., Inc.  
Phoenixville, Pennsylvania**

**40 years of boiler manufacturing experience**

**Continental is sold, installed and serviced by competent distributors throughout the U.S.**



**... the boiler with the  
Spinning Gas Technique**



Bulletin BE3 . . . tells what to look for when you select a packaged boiler.



Bulletin BE4 . . . describes the Continental's Spinning Gas Technique.



## "We had a picnic on the boiler room floor"

"When the Chief Engineer recommended coal-burning boilers for the new plant, one of the directors asked if coal wouldn't make the plant dirty.

"That made the Chief mad! He didn't say anything at the time, but at the first board meeting after the new plant was finished he invited the directors down for lunch.

"You should have seen their eyes! The place was hospital

clean. And why not? The coal came into the stoker through dust-tight chutes, and the ashes were piped out through pneumatic tubes.

"While the directors were eating, the Chief gave them a chalk-talk. On one side of the blackboard he had charted the savings through the use of coal as compared with other fuels. On the other side he had a comparison of our proven reserves of the vari-

ous fuels showing that while other fuels are growing scarcer, we have barely scratched the surface of our almost inexhaustible coal deposits."

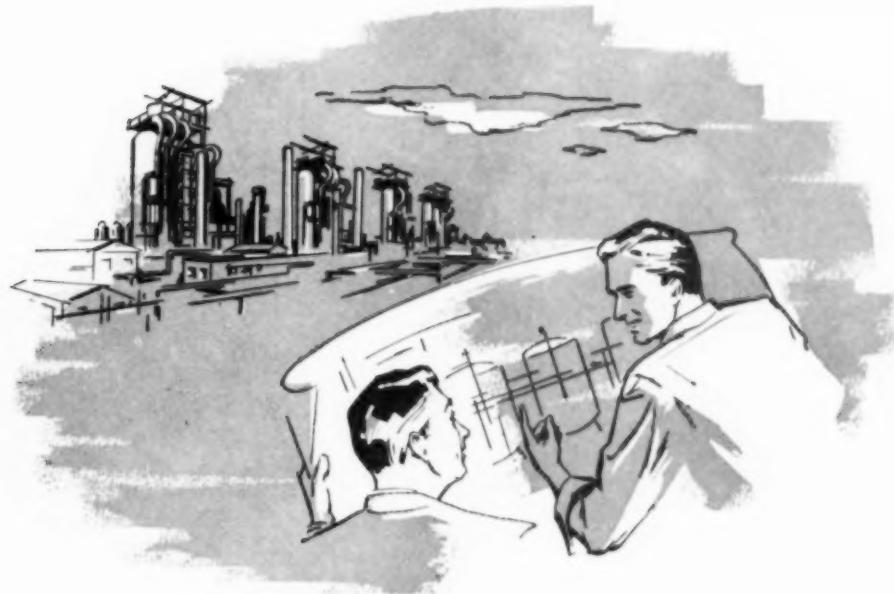
### *Bring your fuel problems to C & O*

As the world's largest carrier of bituminous coal, the C&O is intimately familiar with every phase of coal use. We have a large staff of experts who will gladly help you to locate the coal best suited to your needs; to help you use it most efficiently; to help get it to you promptly.

*Write to*  
Coal Traffic Department  
Chesapeake and Ohio Railway  
2112 Terminal Tower  
Cleveland 1, Ohio



**Chesapeake and Ohio  
Railway**



## HIGHER WATER PURITY BY DEMINERALIZATION

### **... A Cochrane Achievement**

Long experience with *all* phases of water conditioning problems places Cochrane in the position of leader in the design and application of equipment to meet the exacting requirements of demineralization.

Cochrane Demineralizers now operating on boiler feed and process waters are continuously producing effluents with total dissolved solids and silica residuals approaching zero, within the limits of accuracy of available testing methods. These include 2-bed, 3-bed and 4-bed systems—compact mixed bed units—manually controlled or automatically operated.

**Cochrane engineers and manufactures every type of ion exchange precipitation type water conditioning equipment**—which assures you of unbiased recommendations for equipment best suited to your requirements. Its complete service provides single responsibility for engineering, fabrication and continued satisfactory operation.

For information on Cochrane Demineralizers, write for Publication No. 5800 and reprints on demineralization.



## **Cochrane** CORPORATION

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Representatives in 30 principal cities in U. S., Toronto, Canada, Mexico City, Mexico, Paris, France, Havana, Cuba, Caracas, Venezuela, San Juan, Puerto Rico, Honolulu, Hawaii.  
Pottstown Metal Products Division—Custom built carbon steel and alloy products

Demineralizers • Hot Process Softeners • Hot Zeolite Softeners • Dealkalizers • Reactors • Desalting • Continuous Blow-Off • C-B Systems • Specialties

SOUTHERN POWER & INDUSTRY for JULY, 1954



### Other Cochrane Processes

#### **HOT PROCESS SOFTENER**

Highly efficient precipitation at high temperatures reduces hardness, silica, alkalinity and total dissolved solids. Publication No. 3000.

#### **HOT ZEOLITE SOFTENER**

Supplementing the Hot Process Softener, high temperature ion exchange resins completely remove residual hardness with substantial savings in soda ash and phosphate. Publication No. 4801.

#### **SOLIDS CONTACT REACTOR**

Slurry blanket principle efficiently removes solids, turbidity, color, taste, silica, fluorides, reduces alkalinity and hardness from water for boiler feed industrial process and municipal purposes. Publication No. 5001-A.

C100.7

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# LINE



# WIRE

**Here is a single source for every type of covering and conductor—designed, made and tested to highest standards**

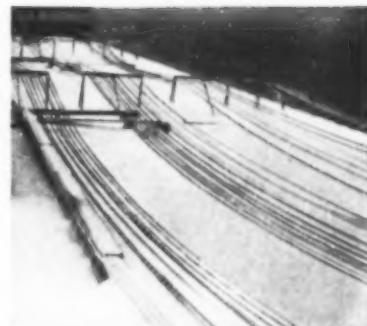
Whatever your system demands of a weatherproof line wire, there's a proven ANACONDA type to satisfy it. You'll find it in this soundly engineered, dependable series:

**DURALINE** — an ANACONDA exclusive — has a unique, interlocked fibrous sheath that provides utmost service dependability . . . and won't festoon.

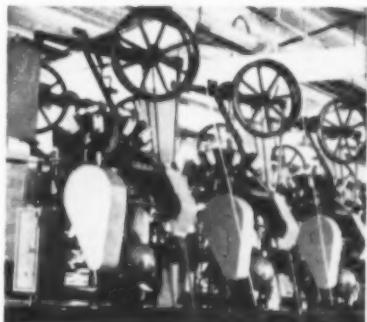
**POLENE** . . . polyethylene-covered line wire . . . resists sunlight . . . handles easily . . . installs conveniently.

**NEOLINE** . . . is a neoprene-covered line wire . . . and provides the well-known features that are found in neoprene-jacketed cables.

**DENSHEATH** . . . covered with a vinyl-resin thermoplastic . . . excellent physical characteristics.



**ALL TYPES** of coverings for overhead conductors are continually being tested by Anaconda Engineers on racks exposed to severe weather conditions.



**MODERN MACHINES** apply Duraline's interlocked and felted fibrous sheath and outer braid before impregnation with URC-type saturant and finishers.

These weatherproof line wires are designed, made and tested to exceed recognized specification requirements — with copper, copperweld or aluminum conductors. Send for samples for study in preparing your specifications. Ask your Anaconda Sales Office or write to *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

## ANACONDA®

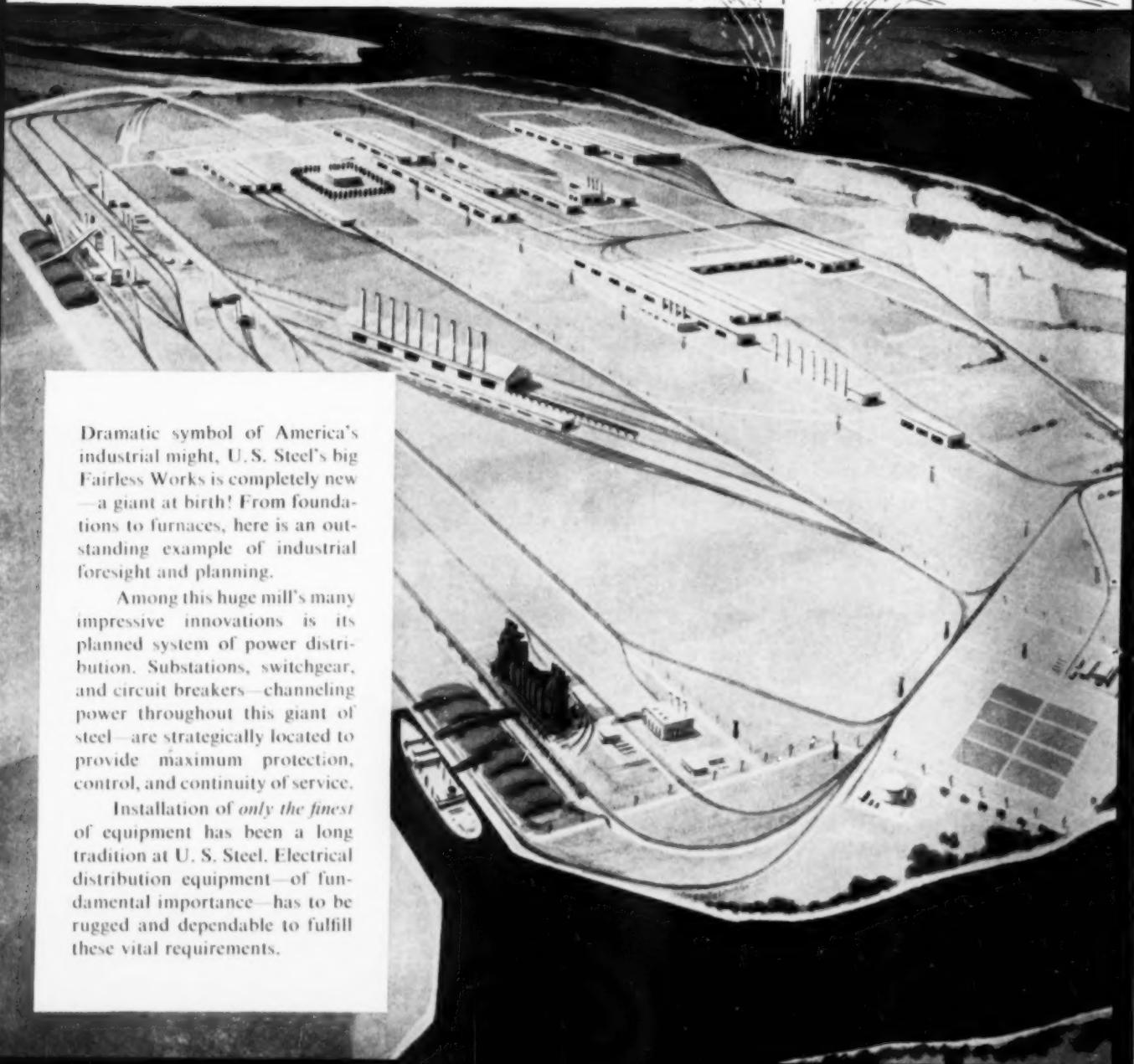
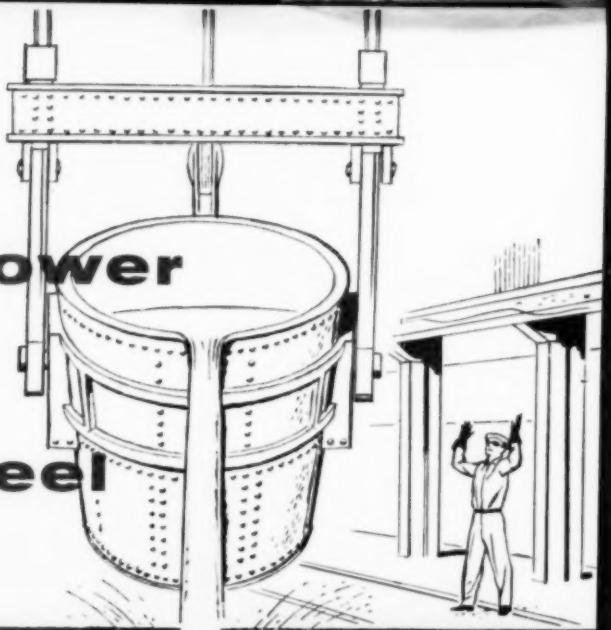
service and overhead distribution cables, bare and weatherproof, including ACSR • signal, control and communication wire • portable cords and cables • mine cables • magnet wire • copper, aluminum and copperweld conductors • wire and cable accessories.

### YOUR CHOICE OF LINE WIRE IN COPPER, COPPERWELD AND ALUMINUM



Reg. U. S. Pat. Off.  
†Trade Mark

# Pouring power into a giant of steel



Dramatic symbol of America's industrial might, U. S. Steel's big Fairless Works is completely new—a giant at birth! From foundations to furnaces, here is an outstanding example of industrial foresight and planning.

Among this huge mill's many impressive innovations is its planned system of power distribution. Substations, switchgear, and circuit breakers—channeling power throughout this giant of steel—are strategically located to provide maximum protection, control, and continuity of service.

Installation of *only the finest* of equipment has been a long tradition at U. S. Steel. Electrical distribution equipment—of fundamental importance—has to be rugged and dependable to fulfill these vital requirements.

# at U.S. Steel's new FAIRLESS WORKS

**kilowatts for a colossus feed  
through switchgear and circuit breakers built by I-T-E**

Some 70 modern indoor and outdoor I-T-E Unit Substations transform and distribute power throughout the mill. I-T-E Low-Voltage and Metal-Clad Switchgear, as well as Heavy-Duty I-T-E Circuit Breakers, guard the many critical steel processes.

From the start, I-T-E gave important engineering assistance in the preparation of specifications and in expediting switchgear orders for the Fairless Works. As a result of this close cooperation, power distribution equipment was on the ground *when needed* to fit right in with tight construction schedules.

Traditionally a supplier of U. S. Steel, I-T-E is proud of its place as a *major* contributor of quality power distribution equipment for the new Fairless Works.

## AT FAIRLESS—

### I-T-E Switchgear protects:

rolling mills  
coke ovens  
**power house auxiliaries**  
billet mills  
strip mill  
blast furnaces

open hearths  
maintenance shops  
office building  
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For Details Contact the I-T-E Field Office nearest you  
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**THE SYMBOL OF QUALITY SWITCHGEAR**



**I-T-E CIRCUIT BREAKER COMPANY**

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**SWITCHGEAR PRODUCTS**



**I-T-E METAL-CLAD SWITCHGEAR**

installed in cold mill for 2400-volt distribution.



**I-T-E LOW-VOLTAGE SWITCHGEAR**

installed in sheet and tin mill for 480-volt distribution.

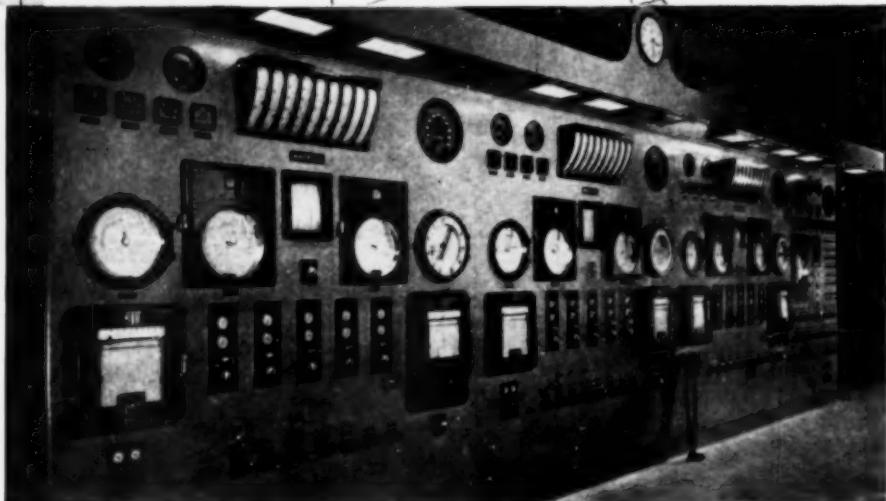


**I-T-E HEAVY-DUTY CIRCUIT BREAKERS**

Types MT and OH, used for DC sectionalizing in billet mill.



All three boilers are checked and controlled from this master control panel which contains Republic gauges, recorders, continuous integrators, manual-automatic transfer sub-panels and biasing sub-panels for adjusting oil air ratio.



From war-wrecked power facilities in 1945 to modern equipment with a generating capacity of over 140,000 kw today is the rehabilitation achievement of which Manila Electric Company can be proud. Typical of the modern equipment now operating is this new 50,000 kw power station. Designed by Gilbert Associates, Inc., it contains three oil-fired boilers, each rated at 250,000 lbs. per hr. at 875 psig and 910° F. To maintain the operation of these boilers at maximum efficiency under all load conditions, Republic Automatic Combustion Controls have been installed. Pressure reducing valves and controls plus feedwater pump controls were also furnished by Republic.

This is but one example of power stations all over the world that are equipped with Republic Combustion Controls. Recent over-seas installations include stations in Italy, Greece, Chile, India and Australia.

Wherever the station, whatever the fuel, draft arrangements or load characteristic, Republic Combustion Controls can operate boilers to hold fuel and air in the correct amounts and proportion for maximum combustion efficiency.

Get the details in Data Book S-21 or contact your nearby Republic field engineer.

**REPUBLIC FLOW METERS CO.**

• 2240 DIVERSEY PARKWAY • CHICAGO 47, ILLINOIS

# Proof of **PERFECT\*** Water Treatment **PERFORMANCE**



Nearly 12 billion pounds of steam have been generated inside this boiler and its twin. Boilers have never been acid cleaned. Tubes have never been turbed. All water side surfaces are clean-to-metal.

**TURN THE PAGE  
FOR MORE FACTS ON  
HOW IT WAS DONE**

\*We at ... think at least 99%!

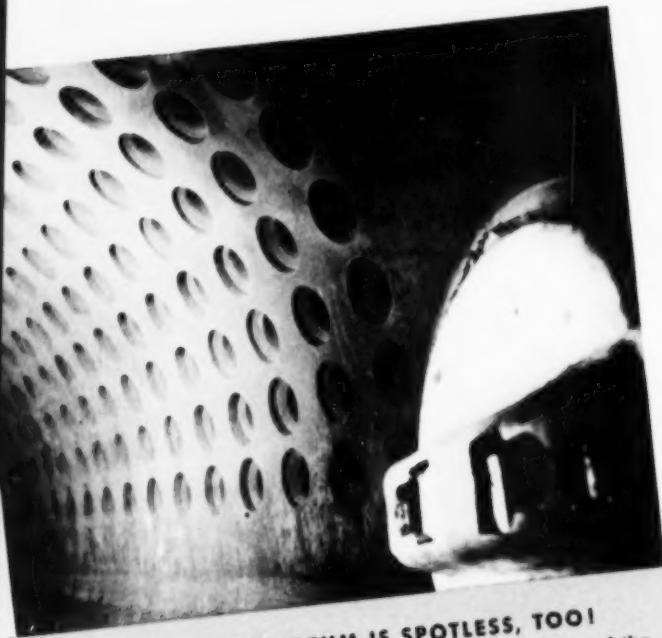
## PERFECT WATER TREATMENT PERFORMANCE (CONTINUED)

### BOILER OPERATING DATA

- Two new boilers were put on line in a Southwestern municipal utility plant at the same time late in 1949. Rated capacity of each unit is 250,000 pounds of steam per hour at 950 p.s.i. Normal operating rates range from 150,000 to 175,000 pounds of steam per hour per unit.

The Nalco System of water treatment has been used continuously in these boilers. Raw water softening is by Nalcite\* Ion Exchange Resins, and other Nalco products are used for after-treatment, internal treatment, and condensate return line protection. Results have been perfect. Boilers have never been turbined or acid cleaned, and are opened only for annual internal inspection.

\* Registered Trademark



#### AND THE MUD DRUM IS SPOTLESS, TOO!

Another unretouched photo inside the mud drum of one of the boilers shows the like-new condition after years of service. No deposits or corrosion of any kind have been found in tubes or drums.

### Nalco ON THE JOB

- Results like these are encountered every day in plants when the complete Nalco System of water treatment is on the job. The Nalco System is adaptable to old and new plants of any capacity, temperature, or pressure. Whether you operate a public utility or a space heating boiler, you will find your Nalco Representative of real assistance in the solution of your water treatment problems. Call him today, or write for full information.

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THE  
*Nalco*®

SYSTEM . . . Serving Industry through Practical Applied Science

here's how  
high temperature  
piping  
can flex  
its muscles



Each pipe hanger is scale tested to rigid tolerances by a skilled workman at the Navco plant. After final assembly and inspection, the hangers are carefully crated and readied for shipment.

# NAVCO Counterpoise Pipe Hangers

Since high temperature piping has no respect for equipment connections, the entire piping system must flex its muscles to absorb the strain of expansion and contraction. This prevents serious stresses that could endanger the installation.

And how does high temperature piping flex its muscles? With Navco's precision engineered Counterpoise Pipe Hanger—the hanger with a load-supporting effort that is of constant value throughout the range of travel. This permits weightless movement of the entire piping system.

To learn how power plants, oil refineries and chemical plants can have piping systems that flex their muscles, write today for Navco's 12-page Counterpoise hanger bulletin #153.



## NATIONAL VALVE & MANUFACTURING COMPANY

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**SEND FOR THIS 32 PAGE MULTICLONE BOOKLET**

**HELPFUL-INFORMATIVE IT OUT-LINES THEORIES AND BASIC PRINCIPLES OF CENTRIFUGAL DUST RECOVERY!**

Or, for special side of pressure, same Multiclone can even be outlet:

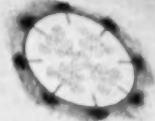


FIG. No. 15

Or, in still other shapes to fit specialized applications.

It is readily apparent that conventional cyclones, with their complicated manifolds and the separate inlet and outlet ducts required for each collector, are far more restricted in their adaptability to space limitations.

A further space adaptability feature found in the Multiclone is the unusual flexibility of its inlet and outlet duct arrangements. Where headroom must be kept at a minimum, the Multiclone can be installed with side inlet and side outlet ducts, giving it an "in-line" installation that requires a minimum of vertical height.



FIG. No. 16

20

FIG. No. 17

...ave, permits horizontal alignment when this feature is used. Multiclone's more uncomplicated duct work makes it more adaptable to existing plant space units than makes it necessary to provide much space when installed in conventional cyclone units. In addition, Multiclone's lower inlet and outlet ducts make it easier to install. It is also possible to change from one Multiclone unit to another unit (FIG. 18).



FIG. No. 18

21

**32 PAGES OF DIAGRAMS AND INFORMATION**

**This booklet shows...**

**MULTICLONE'S SPACE SAVINGS**...How the Multiclone requires less square footage, less cubic footage than most other equipment of comparable capacity and performance, thus saving costly plant space!

**MULTICLONE'S ADAPTABILITY**...How the Multiclone is more adaptable to varying inlet-outlet requirements—to varying space limitations—and is simpler to insulate, thus reducing installation costs!

**MULTICLONE'S EFFICIENCY**...How Multiclone's multiple small diameter tubes, made possible by its exclusive vane design, give higher centrifugal forces and more complete cleansing of all suspended particles—even small ones of 10 microns and less!

**MULTICLONE'S LOW MAINTENANCE**...How the Multiclone has no high speed moving parts to repair or replace, no pads or filters to clean or renew, nothing to choke gas flow or increase draft losses as suspended materials are recovered. Multiclone draft losses remain uniformly low—recovery efficiencies uniformly high—at all times!

**Make sure that a copy of this helpful booklet is in your reference files by sending for your copy now!**

**NO MATTER** whether you are now using mechanical dust recovery equipment or are planning the installation of such equipment at some future date, here is a booklet that is full of helpful and valuable information on centrifugal dust recovery. It not only explains the basic methods and principles involved, but also shows the important differences between small and large diameter separating tubes, shows how to simplify your duct work and reduce installation costs, and outlines many other important factors to be considered in selecting mechanical dust recovery equipment.

In addition, this informative booklet illustrates and explains how **MULTICLONE'S** unique *vane* design is fundamentally different...how it makes possible greater compactness, simpler installation, high recovery of the small particles as well as the medium and coarser ones, and many other facts on **MULTICLONE** advanced design.

A limited supply of these booklets is available for free distribution to those interested in mechanical recovery equipment and methods. Write for your copy today.

**NOW SELLING...**



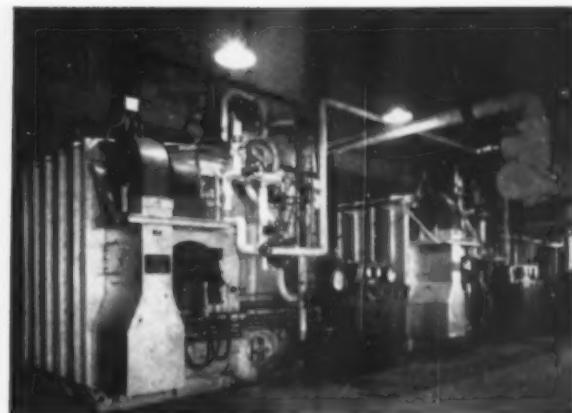
...in all parts of the U.S.A. and foreign countries.

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# Why are they buying VP BOILERS?



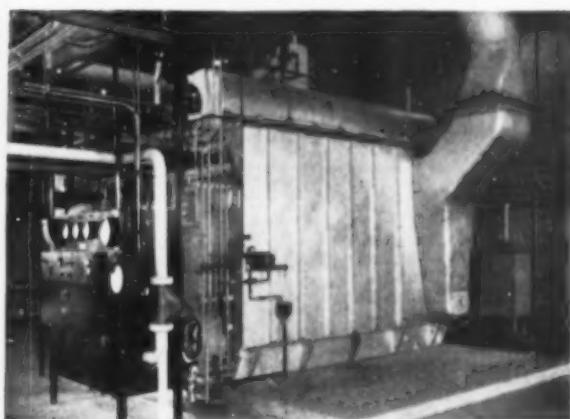
Industrial installation in the Midwest. Two VP Boilers.  
Capacity — 28,000 lb steam per hr each at 225 psi.

There's good reason for the fact that so many buyers of package boilers are finding that the VP offers them more for their money. For only in the VP will you find such significant *extra* features as — more water-cooling area per unit of furnace volume than any other boiler of its class . . . simple arrangement of baffles for maximum heat transfer . . . large lower drum for good accessibility and easy handling of load swings . . . quiet centrifugal fan, with less than half the noise level of typical high-speed blowers used on most other package boilers.

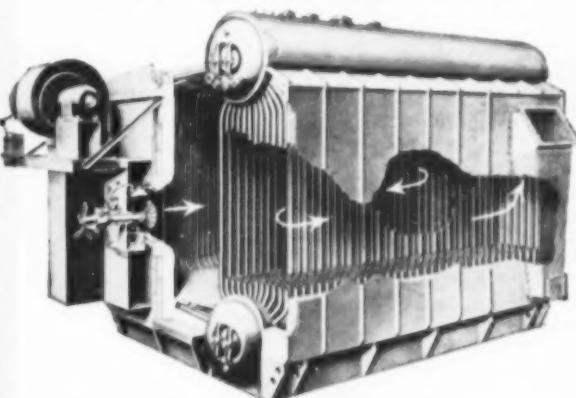
Little wonder then that VP purchasers range from small companies to some of the largest in the country . . . industrials of all kinds . . . schools and institutions . . . various government agencies . . . even the Atomic Energy Commission. These users are employing VP Boilers for all types of applications — heating, process, and even power generation.

Make sure then that you have details of the VP at your fingertips when next you are in the market for a boiler of moderate capacity. Ask for the new Catalog VP-214, which contains specifications and general information on dimensions, space requirements, construction details and controls.

B-748A



This VP Boiler serves a sewer pipe manufacturer in California. Capacity — 20,000 lb steam per hr at 215 psi.



#### Specifications — VP Boiler

Capacity—4000 to 30,000 pounds of steam per hour

Pressures—Up to 500 pounds per square inch

Fuel—Oil or gas

Erection—Completely shop-assembled

Foundation—Simple concrete slab



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Prat-Daniel offers the THERMOBLOC Direct-Fired Heater to Southern Industry through these long-established, qualified companies in the South. They are ready to help you find the answer to your industrial heating problems.

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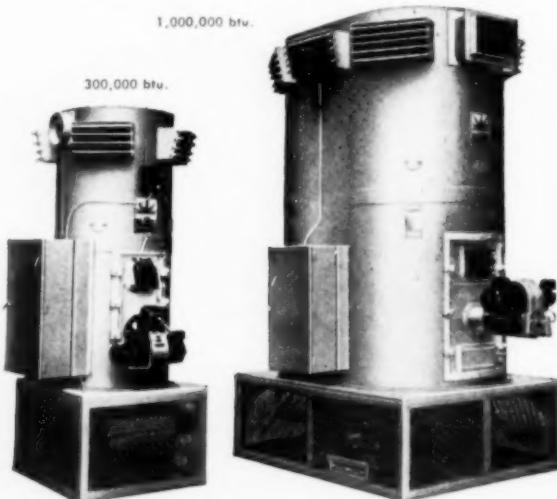
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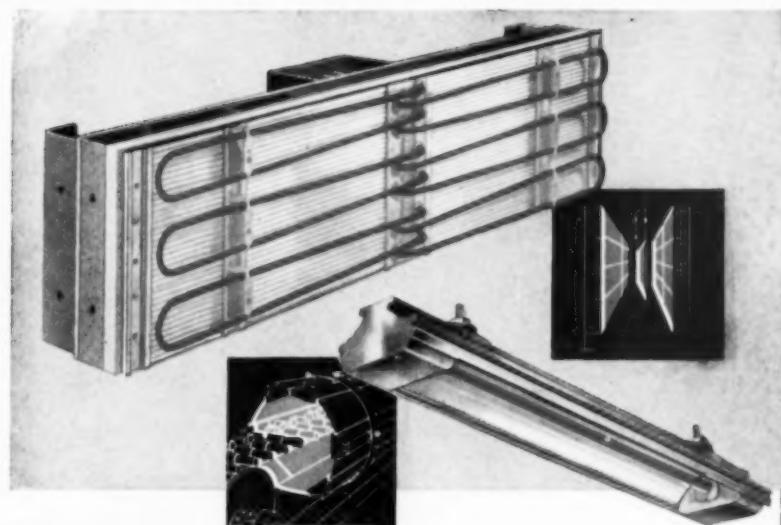
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For over 30 years Prat-Daniel has designed, engineered and manufactured heat transfer and power plant equipment.





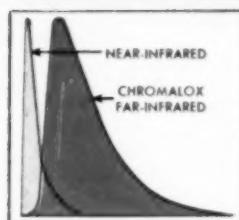
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### *Far-infrared*

#### solves hundreds of heating problems

Here's your quick, economical and easy solution for curing, drying, degreasing, dehydrating, baking and other heating jobs. Pre-engineered Chromalox Units make oven building as simple as A-B-C, generate uniformly absorbed far-infrared heat for a multiplicity of processing needs. Temperatures up to 700° F. are easily selected, accurately maintained. Low initial cost, low write-off cost, low operating cost!

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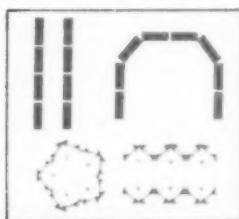
##### Color Blind Radiation

Longer far-infrared wave lengths are absorbed efficiently by all colors and textures.



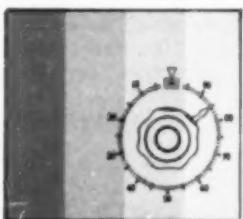
##### Heat Without Hot or Cold Spots

Chromalox radiant energy goes to work in a uniform pattern to span widest conveyor.



##### Low-Cost Oven Assembly

Pre-engineered Chromalox units require minimum expense to erect into complete ovens.



##### Infinitely Variable Heat Output

Heat from 0 to 100% of capacity to fit the exact temperature needs of the work.

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FOR MODERN INDUSTRY

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- R-126. Drying Tractor Parts
- R-118. Baking Synthetic Enamel on Gasoline Engines
- Also see, Paint Baking

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- R-131. Baking Paint on Meter Parts
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- R-101. Molding Kapok Center for Softballs
- R-102. Drying Plastic Powders
- R-104. Preheating Micarta Strips for Punching
- R-121. Dehydrating Vinyl Sheets
- R-123. Drying Plastic Laminates
- R-128. Curing Plastic Coating on Spring Clips
- R-129. Fusing Vinyl to Chip Board
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- R-103. Static Removal
- R-107. Drying Ink on a Miehle Vertical Press
- R-108. Ink Drying on B-Unit Web-Fed Offset Press
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- R-112. Dehydrating Braiding Material

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IC-71

# Single Valve Saving \$150 Yearly

...on severe ash blower service,  
for example...

## The Installation

At City Light & Power Company, Washington, Indiana—with Crane bronze angle valve in 2-inch steam line to boiler ash blower manifold. Working pressure: 300 psi, 525 degrees F.

## Valve Service Ratings

### SUITABILITY:

Perfect match for needs

### FEATURES:

Crane Plug Type Disc

### MAINTENANCE COST:

One stem replaced in 3 years

### SERVICE LIFE:

Already 12x former valves

### OPERATING RESULTS:

Over \$400 saved to date

### AVAILABILITY:

Crane catalog item—No. 384P

## The Valve

Crane plug-type disc and seat design make a most effective seating combination for tough steam service. Highly resistant to damage by foreign matter, wire-drawing, erosion, cutting, galling, etc. The wide tapered disc allows fine, accurate throttling. These rugged bronze valves come in globe and angle patterns; see your Crane Catalog or Crane Representative.



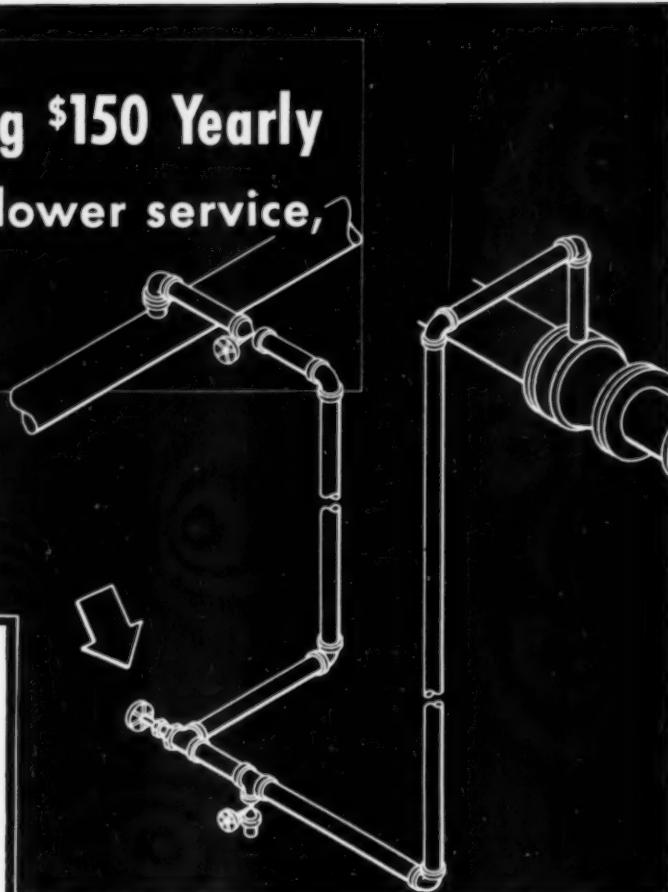
THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

# CRANE VALVES

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Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

42 SOUTHERN POWER & INDUSTRY for JULY, 1954



## The Case History

Valves formerly had to be replaced every 8 to 12 weeks, their cost alone exceeding \$150 yearly. It's a tough spot even for a good valve.

The valve's location in the steam line is below the boiler water level. Each operating cycle exposes it to a long leg of condensate, with an abrupt change to hot steam direct from the boiler header. On closure, the valve is again subject to cooling, and that's the cycle about 8 times daily.

Under those conditions, this Crane No. 384P Bronze Plug Type Disc Angle Valve put a stop to former replacement cost, saving more than \$400 in 3 years since installed. Still the valve remains tight, dependable, and fully fit for service. That's the result of choosing the right valve—the choice assured by Crane quality and the completeness of the Crane line.



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During 1953, '54 and '55  
U. S. coal-burning power plants  
will have increased  
generating capacity  
by 21,710,500 kw.

—Federal Power  
Commission Report

**55%**

For plants representing better than  
The Allen-Sherman-Hoff Co. is providing  
the ash & dust handling equipment.

Of 3,186,000 kw projected for 1956  
A-S-H contracts already cover over 1/3.

### Why this vast participation

Having pioneered in ash & dust handling development and having collaborated with hundreds of power-plant engineers, A-S-H brings to each new problem a fund of experience that is without parallel. Ideas projected on our drawing boards at Wynnewood and tested in our equipment-manufacturing plant at Hamburg, Pa., will help you get what you want for your plant—increased efficiency with economy.

**THE ALLEN-SHERMAN-HOFF CO.**

Dept. L-259 E. Lancaster Ave., Wynnewood, Pa.

Offices and Representatives in Principal Cities

**HYDROJET**

(hydraulic)

materials handling systems



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**CLIMATE-PROOF CASE.** Rain tight... snow tight... dust tight... sand tight... frost tight. The American Bi-Metal Thermometer can withstand submersion, hot blasts, dust, hot gases, extreme temperature changes and long exposure to the elements.

**MAXIMUM RESPONSE — MINIMUM FLUTTER.** Highly sensitive dampening fluid on bi-metal coil assures fastest response to temperature changes and greatest resistance to pointer flutter and destructive vibration.

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Accuracy is guaranteed within 1% of the scale range. Application is simple and fast. Adequate clearance at back of case permits easy use of wrench during installation. Get complete information about these precision-built, long-life thermometers. Write for Bulletin 144.

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MAKERS OF 'AMERICAN' AND 'AMERICAN-MICROSEN' INDUSTRIAL INSTRUMENTS, 'HANCOCK' VALVES, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, AIRCRAFT PRODUCTS BUILDERS OF 'SHAW-BOX' AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.



## *Accurate* **AMERICAN BI-METAL DIAL THERMOMETERS**

### **SPECIFICATIONS**

**Temperature Ranges:** From minus 60° to 1000° F.

**Dial Sizes:** 3½" and 5". Graduations over full 270° arc.

**Case:** Aluminum alloy with smooth, black enamel instrument finish.

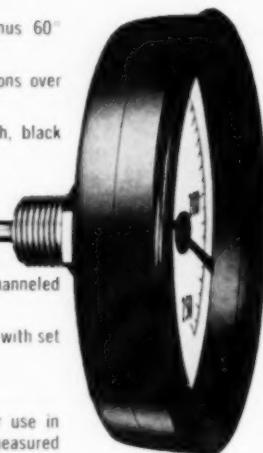
**Bezel:** Screwed to case.

**Front:** Heavy plate glass set in channeled gasket seals the case.

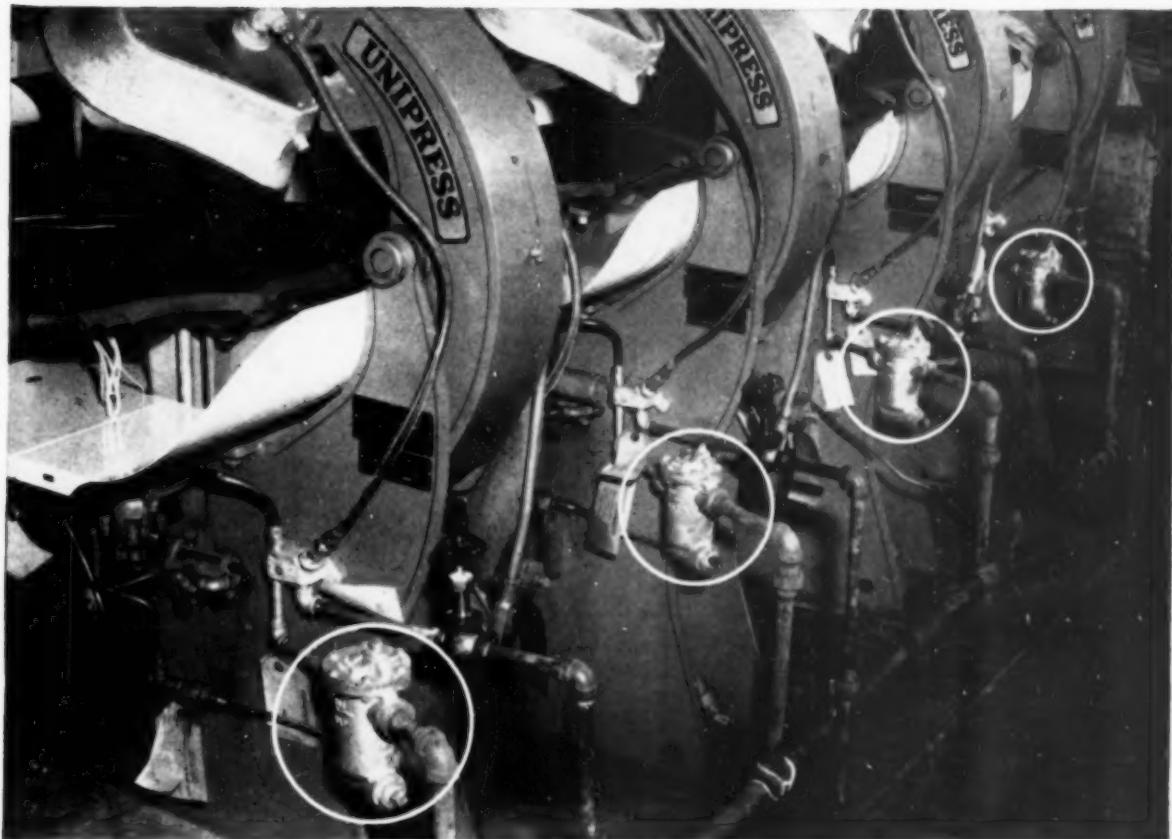
**Pointers:** Adjustable type attached with set screw; easy to get at for setting.

**Connection:** Fixed, ½" N.P.T.

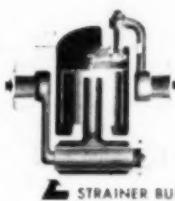
**Separable Sockets:** Available for use in closed systems or where the measured medium is corrosive to the stainless steel stem. Fit over all standard stem lengths except 2½".



# You can't save money by skimping on Steam Traps— An Armstrong Trap on every unit always pays dividends



## Plant doubles production without appreciable increase in fuel costs



STRAINER BUILT IN

Built-in Strainer Traps save fittings, labor, maintenance. Cost less than separate trap and strainer. Complete data in literature mentioned below.



When Standard Coat, Apron & Linen Service took over a previous linen service plant in Portland, Maine, the boilers could hardly handle the steam load. Mr. Tom Foley, General Mgr. called File's Steam Specialty Company, Armstrong Trap Representative in New England, to help correct the condition.

Under supervision of Mr. Ken Raymond, Chief Engineer, Armstrong traps were installed on each unit in the plant.

**Results: doubled production with no appreciable increase in fuel consumption; higher machine**

**temperatures; boilers easily handle the load.**

This is a typical example of the efficiencies and economies possible through Armstrong unit trapping. Could your plant stand a shot in the arm? Call your Armstrong Representative, or write:

**ARMSTRONG MACHINE WORKS**  
806 Maple Street, Three Rivers, Michigan

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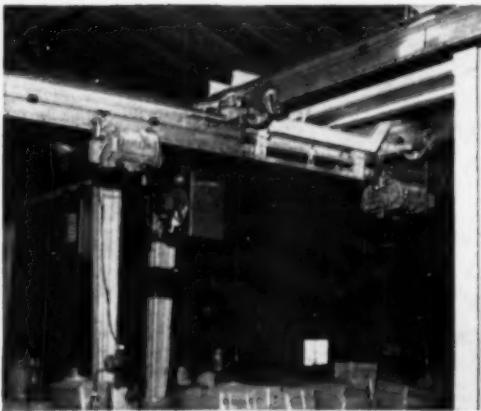
—The "Steam Trap Book" contains 44 pages of trap data — selection, maintenance, troubleshooting. Free on request. Or Consult Sweets or CEC.



# ARMSTRONG STEAM TRAPS

**for smooth operation at low maintenance cost use.....AMERICAN MONORAIL CRANES**

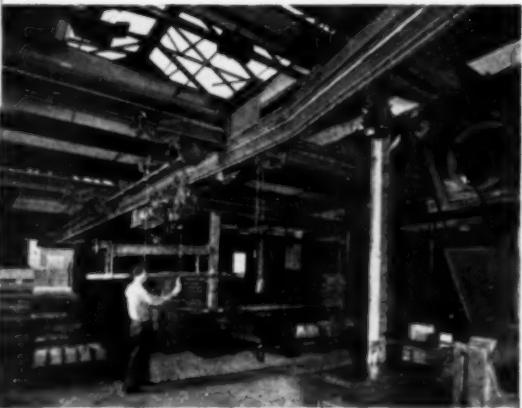
Three-ton hoist hook service extends from craneway to craneway by finger-tip controlled passage of carrier across crossover with cranes interlocked at each end.



Three MonoRail cranes are interlocked to form passageway for transfer from receiving dock to steel storage area. Crane in foreground interlocks with spur track to each shear.



One-ton hoist operated from crane bridge to crane bridge interlocked at crossover between craneways.



To handle variable loads over maximum areas, MonoRail Cranes offer smooth travel, easy movement, interlocking service between and beyond crane-ways, low initial cost and most

important low maintenance cost. American MonoRail engineers are experienced in all phases of "up and over" handling. They are available for free consultation at your convenience.



**AMERICAN**

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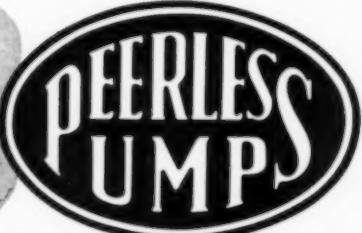
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**MonoRail** COMPANY  
13105 ATHENS AVENUE • CLEVELAND 7, OHIO



# Peerless Pump Designs

*that squarely meet every  
WATER HANDLING REQUIREMENT*



#### TYPE A AND TYPE AS GENERAL PURPOSE PUMPS

Use these pumps in the widest range of water handling services. Single stage, horizontal split case design. Mechanical shaft seal construction available in sizes up to 4" (Type AS). Heads: up to 300 ft.; capacities up to 70,000 gpm.

THESE ARE THE PUMPS

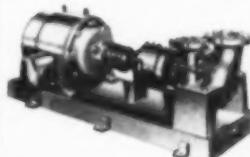


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#### TYPE PR AND TYPE PRS HIGH TEMPERATURE, HIGH PRESSURE PUMPS

Horizontal center-line-mount pumps with packing gland or mechanical shaft seal construction. End or top suction designs. Heavy duty pumps for heads up to 675 ft. Capacities: up to 1000 gpm and temperatures up to 850°F.



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America's broadest line of economical, general purpose pumps. Horsepower range from  $\frac{1}{4}$  to 150. Head range to 260 ft. Capacities up to 5500 gpm. Easy to buy, apply, install and maintain. Tens of thousands in use.



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B-2300

#### TYPE TU AND TYPE TUT MULTI-STAGE PUMPS

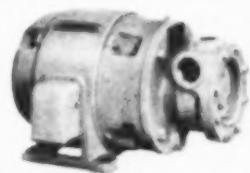
2,3,4 and 5-stage designs for supplying, circulating and boosting water and other liquids in moderate capacities against medium and high heads. Durable and dependable in operation. Heads up to 1660 feet; capacities up to 3000 gpm.



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B-1400

#### TYPE TVE AND TYPE TVB TURBINE VANE PUMPS

For pumping hot and cold, clear and vaporous liquids in small capacities against high heads. Widely used throughout industry for water boosting, circulating, transferring. Easy to install and maintain. Capacities: up to 58 gpm; heads up to 800 feet.



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SP&I



Floorstand equipped with Motor Unit . . . control panel, motor, limit switch and push button station.

Chapman Motor Units have fewer components than any other units, providing greater dependability, much lower maintenance costs.

There are only two pinions and two gears in the motor reduction train: drift is eliminated and lash is negligible. Your valves seat tight, but not too tight. Operation is *always* smooth and trouble-free.

You can mount the Chapman Motor Unit in any position, at any angle required. The rugged stub-tooth gears require no grease

# Simple and **RUGGED...**

## **CHAPMAN'S MOTOR UNIT** for Valves, Floorstands and Sluice Gates



Simple, durable mechanism of Chapman's Motor Unit. Handwheel remains stationary during motor operation.

or oil bath . . . yet run smoothly, quietly, with minimum wear.

Weatherproof and steam tight, Chapman's floorstand units are shipped completely wired, ready to connect to your power leads, for easy, rapid installation. This modern motor unit is dependable and economical. Send for new catalog No. 51.

**The CHAPMAN Valve  
Manufacturing Company**  
INDIAN ORCHARD, MASSACHUSETTS

# TIMELY COMMENTS



## "Dragon Fur" a Tool For Industry

"TEFLON" tetrafluoroethylene fiber is a new fiber so resistant to heat and chemicals that laboratory workers call it "dragon fur." The Du Pont Company fiber has unparalleled resistance to chemical attack. It resists action by such chemicals as sulfuric, nitric, and hydrochloric acids.

The solution aqua regia—so-named "royal water" by medieval alchemists because it would dissolve gold—does not affect Teflon. In the range of chemicals, Teflon is affected only by fluorine gas and chlorine trifluoride at high temperature and pressure, and by molten-alkali metals.

Produced only in experimental quantities at present, the fiber is being evaluated strictly as a tool for industry. It has high mechanical strength over a wide range of temperatures. It retains useful strength to over 400 F and for some applications even over 500 F. Its impact strength is high even at -90 F.

Projected end uses include liquid-filtration fabrics, gas-filtration fabrics, packing for pump shafts, gaskets for flanged piping and other joints, special conveyors and beltings, special roll covers, diaphragms for valves, electrical tapes and wire wraps, and sewing thread.

## Plastics for Chemical Equipment

Unplasticized polyvinyl chloride has been successfully used by European engineers in the production of massive and complicated chemical equipment, some of it in service as long as fifteen years. Knapp Mills, Inc., a leader in the clad metal field, is expanding its service into the plastics field and has undertaken a foreign licensing program.

The company emphasizes that it is avoiding what so often happens where new and promising materials are utilized on a wide scale for complex purposes. There is often considerable unjustified dissatisfaction resulting from misapplication, poor design, or from an improper technical understanding of the purpose for which the materials are suited.

When this happens it leads to confusion, waste, and loss of production, much of which should be avoidable. The tendency, then, is to blame the basic material. Of course, after years of experience have been accumulated, everyone learns what a material can or cannot do, but it should not be necessary to needlessly expend millions of dollars by shot-gun methods of selection or employment in this day and age.

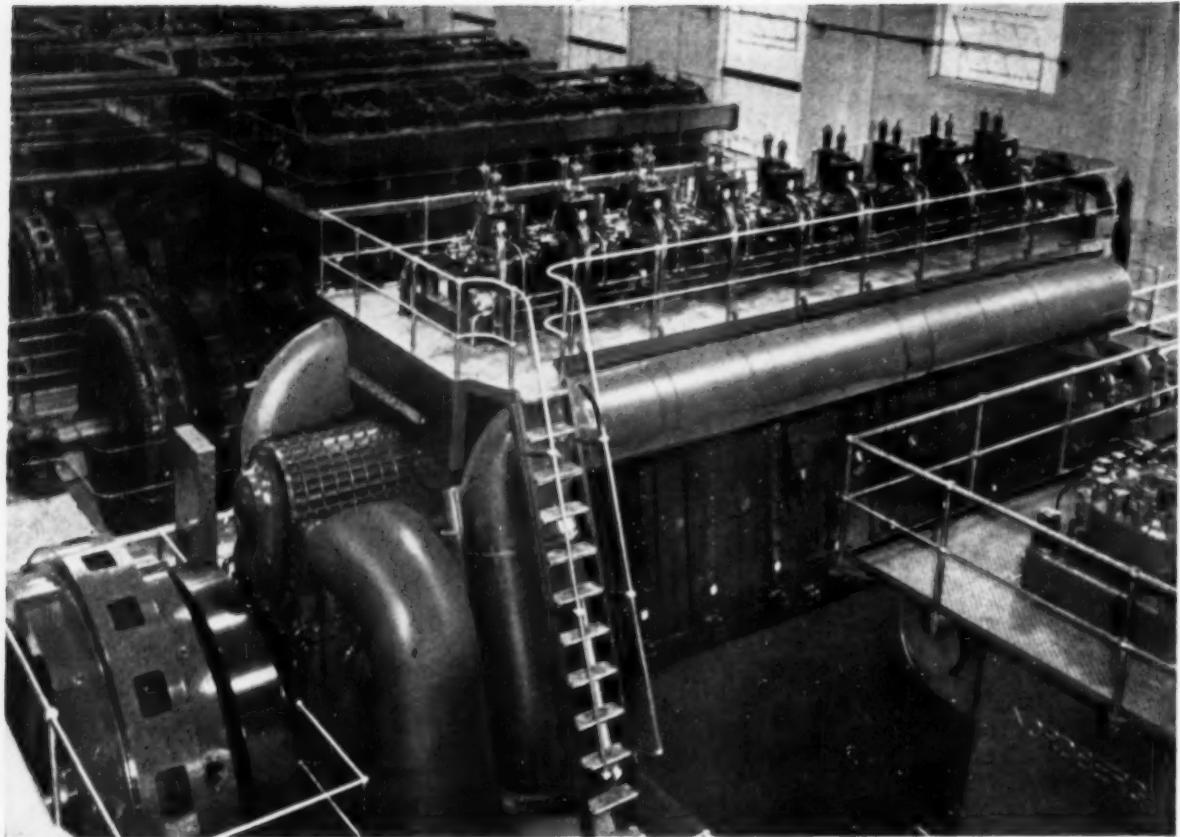
## Stainless Steel Tubular Products

Demand for stainless steel tubing of the standard grades, and of special grades having unusual strength properties under conditions of high temperature and stress has resulted from rapid advancements in the atomic energy, aircraft and boiler industries. Progress in such industries as chemicals, textile, food, bearings and paper have also created new uses for the tubing.

To help fill the market demands for these products, The Babcock & Wilcox Company has increased its productive capacity for stainless steel tubular products by nearly 40%. The company notes that although the production of all forms of stainless steel in 1953 increased about 26% over 1950, the production of stainless tubing increased approximately 88% in this period.

B&W records show that sales to the oil, chemical and textile industries were more than doubled from 1948 to 1953. Numerous new uses for stainless tubular products have also contributed to the increased demand and the search for a higher quality product has remained constant.

In the boiler industry, the trend is to higher and higher temperatures with attendant increases in pressure. If the generation of electric power by nuclear energy is to become a commercial success, tubes must be available which can withstand the unusual conditions imposed. The aircraft industry is a good example of new uses. Today, stainless tubes have as many as 60 different uses in certain airplanes. The furniture industry is also using more and more stainless tubing.



**Largest Diesel Power Generating Station in the U.S.  
reduces cylinder and  
piston ring wear with  
SHELL ROTELLA OIL**

Electric power for the City of Grand Haven, Michigan, and the surrounding area, is generated by diesel engines in the largest municipal power station of its kind in the U. S. A. Shell Rotella Oil is the cylinder lubricant.

The anti-corrosive action in Shell Rotella Oil combats the major cause of engine wear . . . cylinder and piston ring wear caused by acid action from the by-products of

incomplete combustion and condensation.

Tougher lubricating film in Shell Rotella Oil gives cylinders and rings greater protection . . . minimizes wear. Its effective detergent-dispersant action prevents harmful deposits.

Write for technical information. See for yourself how Shell Rotella Oil can help reduce your engine maintenance costs.

**SHELL OIL COMPANY**

50 WEST 50TH STREET, NEW YORK 20, NEW YORK  
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA



# INDUSTRY SPEAKS

SOUTHERN POWER  
AND INDUSTRY

## .. If We Follow the Lure of Cheap Wages

Adapted from comments by Henry B. Du Pont, vice-president of the Du Pont Company, before the recent annual meeting of the Virginia State Chamber of Commerce.

"**N**ATIONAL SECURITY must not be auctioned to the lowest bidder. There are no bargains in the safeguarding of our freedom. I have no quarrel with the objectives of helping our allies in any way consistent with our own interests. It is a reasonable, a humanitarian, and a business-like purpose. But to deplete our own resources and weaken our own defenses is no answer, either to our allies or ourselves."

Nothing must handicap or impede the development of those industries which are essential to the national security and the national defense. "Our industrial strength must be sufficiently robust to meet the challenge of any enemy. Unless it is, we may reach that sorry day when there are no ramparts left to watch and none of us left on hand to watch them.

"A great debate is being waged on the whole question of our commercial relationships with our allies in Europe and with the rest of the world. The argument is advanced that the economy can best be served by 'trade, not aid' and that reducing our tariff barriers would accomplish this. This has a persuasive air, of course, for obviously trade is a desirable process and aid is not.

"The big issue, it seems to me, is not one of tariffs, high, medium, or low, but of what this country must do to insure its security and prosperity in a troubled world. Conceding that we have a stake in the prosperity of other nations, other nations have an even stronger need for our prosperity here. Our position in the present military situation is obvious, and we can fulfill our responsibilities only when we are economically strong. Commercially, it must be remembered our purchases of European commodities rise and fall with our domestic economy. We are a good customer only when our consumer purchasing power is high.

"It is only on those products where wage rates are a major factor in the cost or where the material has a strategic importance that some degree

of protection is necessary. To imperil our position through the plea of lower costs of the foreign producer is a folly with the threat of a tragic aftermath."

Citing the organic chemical industry as an illustration, Mr. du Pont said that as late as 1915 Germany was the principal source of all organic chemicals. It was not until necessity led this country toward establishment of its own organic chemical industry in 1916 that we even began to be self-sufficient in drugs, dyes, rubber chemicals, and other needs. When German producers, with their low wage structure, resumed manufacture after World War I, American manufacturers were able to keep going only because Congress believed their survival to be in the national interest. It granted enough tariff protection to keep the foreign makers from underselling American firms and putting them out of business.

"Let's suppose," he said, "that this country had taken the position then that, if the Germans could make organic chemicals cheaper than we could, they should get the preference. The American sources would have withered away. World War II would have caught us without the plants, the facilities, or the technical know-how to produce our own medicinals, dyes, or other organic materials, including such vital military items as picric acid or toloul. Without the nucleus of this technology and trained personnel, we would have lagged far behind in other fields as well. We would have lost the war before it started.

"If we follow the lure of cheap wages to its most ridiculous lengths," Mr. du Pont said, "we should by all means buy our heavy armament, our ammunition, and even our atomic weapons, from the Russians, whose prices, if they should reflect the wages paid their workers, are surely the lowest we could find.

"Everyone knows," he continued, "that modern warfare is as dependent upon technology as it is upon human performance, and that a corps of scientifically trained people is as vital as a corps of artillery or an Air Force wing. What is not so obvious, perhaps, is that both technology and technical manpower are dependent upon industrial opportunities."

**Three extinguishing agents meet  
all the requirements . . .**

## FIRE PROTECTION in Florida Utility

GULF POWER COMPANY'S Scholz Steam Plant (formerly River Junction Plant) in northwestern Florida is one of the first power plants in which full fire protection has been engineered "from-the-ground-up."

**THREE AGENTS**—carbon dioxide, chlorobromomethane and high pressure water fog—meet all the fire protection requirements. Backbone of defense is the high pressure water fog system.

THE Scholz Steam Plant (formerly River Junction) of the Gulf Power Company is located on the Apalachicola River in northwestern Florida. The initial installation consists of two 40,000 kw hydrogen cooled turbo-generators. The two boilers are coal fired. Their capacity is 425,000 lb per hour each, the steam pressure is 875 psig and the temperature is 900 F. The design permits the addition of two 60,000 kw units.

Power is generated at 13,800 volts and distributed at 115,000 volts. The two power transformers are three phase units, having a rating of 45,000 kva each. There are three 3750 kva, three winding, station service transformers, one of which serves as a spare.

This is one of the first power plants in which full fire protection has been engineered, so to speak, from the ground up.

The fire hazards in modern steam generating stations are greater than those in older stations. The drive for higher efficiencies has resulted in more complicated equipment, higher steam temperatures and pressures, larger units with higher oil requirements, more complicated fuel problems—and consequently, larger capital



expenditures. The problem of possible loss of generation has also become more serious.

A fire in such a modern plant can progress beyond the incipient stage in a matter of seconds. An overall complete fire protection installation has to be fully effective on all hazards encountered. Knowledge as to the characteristics of the fire extinguishing media available is essential for their proper application. Speed of extinguishment, lasting cooling effect, good holding action in delaying reflash, and relatively low toxic effect are important. The application of the extinguishing agents should not add to the fire damage already done.

Spectacular improvements in the art of fire extinguishment were made during the second World

War. High pressure water fog and chlorobromomethane are changing the existing fire fighting techniques.

### Extinguishing Agents

Thorough studies and tests resulted in the preferred application of only three extinguishing agents at the Scholz plant—**carbon dioxide, chlorobromomethane and high pressure water fog**. These agents have many very desirable characteristics and very few disadvantageous ones. They meet all the requirements for combating steam generating plant fires. Characteristics and after effects of other extinguishing agents make them less desirable for power plant protection.

**Portable carbon dioxide and chlorobromomethane units** are

### By A. MERGENTHALER

Prin. Elec. Design Engr.

### K. W. BOYLES

Principal Engineer

### F. G. DOAR

Senior Engineer

### of Southern Services, Inc.

Birmingham, Alabama

Gulf Power Company and Southern Services, Inc., in cooperation with Associated Engineers, conducted fire tests and demonstrations at this station in October of 1953.

Purpose of the tests was to demonstrate that fires most likely to occur can be controlled more effectively with these modern means than with equipment heretofore available. Test results, adapted from Gulf Power Company's official report, were published in *Southern Power & Industry* for March, 1954, pages 60 through 66.

used for quick extinguishment of small fires that can be reached before spreading. **Fixed carbon dioxide systems** have been installed for the protection of the 2300 volt and 575 volt switchgear and also for fighting oil fires under the turbine, by means of hose reel assemblies with cluster type nozzles. The real backbone of defense, however, is the **high pressure water fog system**.

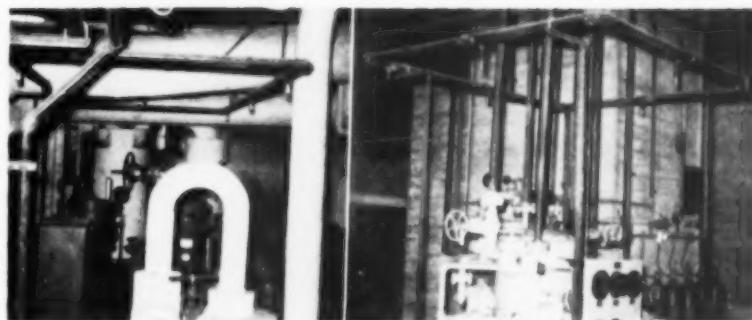
#### Water Fog System

A requisite for satisfactory operation of any fog system, employing discharge devices with small orifices, is a clear water supply. The water source in this case is the deep well which normally provides sanitary water requirements in the plant.

To assure an adequate supply of water, in the event of a prolonged fire, a 150,000 gallon storage tank has been provided solely for fire protection. At maximum capacity of one fire pump, this represents approximately a three hour supply of water. The 500 gpm deep well pump is used for filling the tank.

In order to produce fog that can quickly extinguish fire, a nozzle pressure of not less than 90 psi is essential. To meet this requirement, two fire pumps, each developing a discharge pressure of 175 psi at 750 gpm, have been installed. One of the fire pumps is driven by a gasoline engine and the other by an electric motor which is connected to the station service system.

The motor driven pump will be started immediately following a fire alarm. Remote fire pump control stations are located throughout the plant and in the coal handling area. The gasoline engine driven fire pump is also started as soon as a designated operator arrives at the pump house. After the engine driven pump has been warmed up and brought up to speed, it is allowed to take over, thus permitting efficient pressure regulation under the varying water requirements that are possible. The engine driven pump assures adequate water supply in case of station service power failure.



FOG HEAD SYSTEM installed over turbine oil reservoir (left) and over hydrogen sealed oil unit (right).



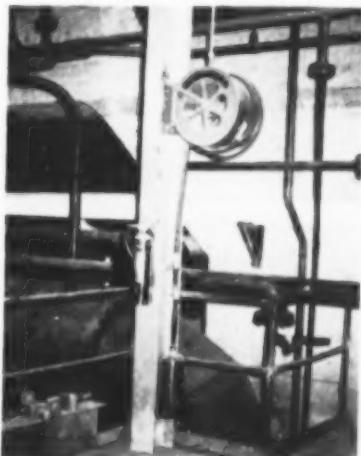
HOSE OUTLET and fire hose in rack (left). Battery of CO<sub>2</sub> cylinders and directional valves for fire protection of station service switchgear are shown at the right.

The pumps are housed in a steel frame, corrugated asbestos covered building located adjacent to the 150,000 gallon water storage tank. The pumps discharge into a 6" header located inside the pump house. From this header the supply lines are routed in the following manner:

- (a) 1—6" line for the main power transformers, the station service transformers and the turbine room equipment which includes the lubricating oil storage tank, lubricating oil reservoirs, oil conditioners and hydrogen seal oil tanks.
- (b) 1—6" line for boiler room equipment.
- (c) 1—3" line for lighter oil tank, coal crusher house and track hopper.
- (d) 1—6" connection for future units 3 and 4.

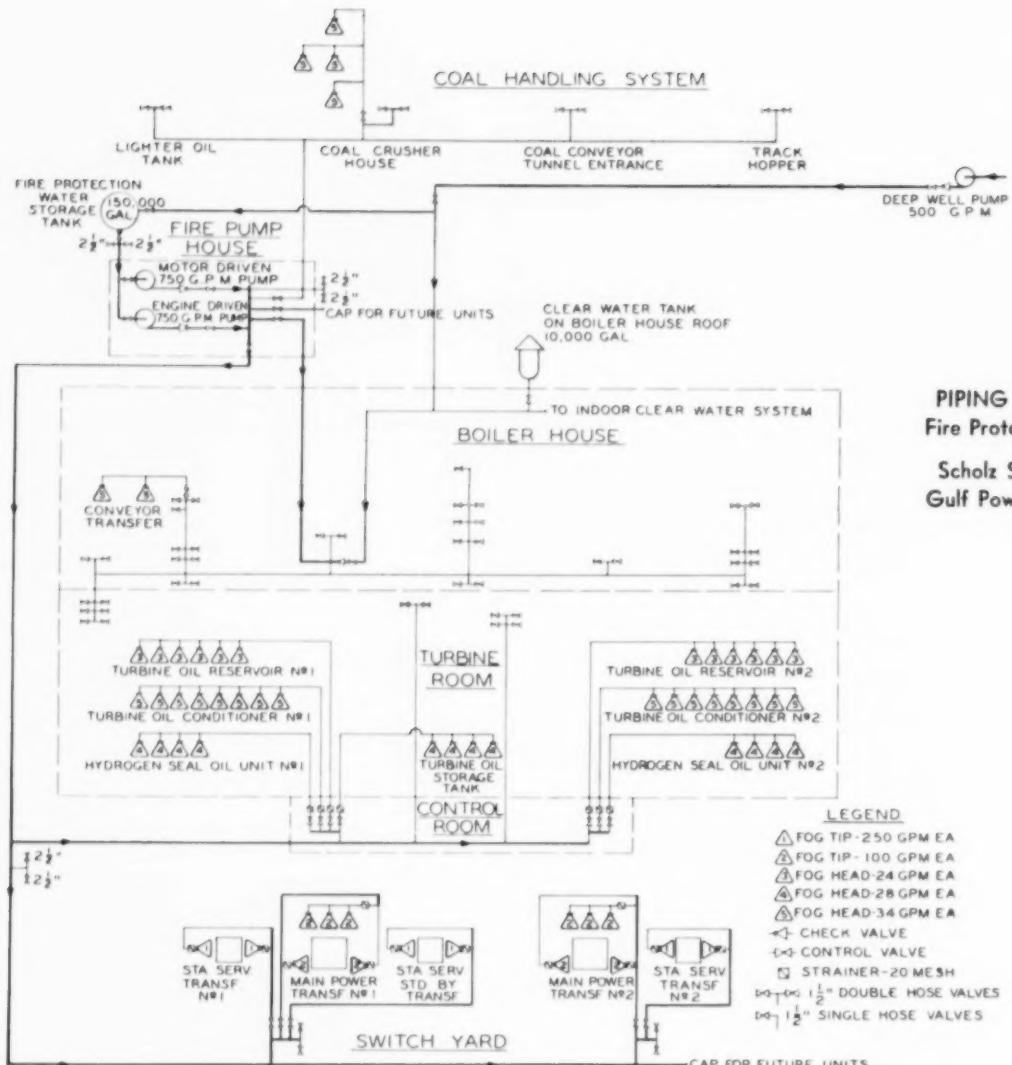
Isolating valves for the above supply lines are also located inside the pump house.

The piping system is so designed that a minimum residual pressure



CO<sub>2</sub> hose reel assembly with cluster type discharge horn. One gallon chlorobromomethane portable extinguisher mounted on column.

of 100 psi can be maintained at the fog tips, fog heads and fog nozzles. Since a "dry" piping system could result in serious damage to equipment if a valve is accidentally left open, it was decided to make this a "wet" system. Thus the water mains are con-



**PIPING DIAGRAM**  
Fire Protection System

Scholz Steam Plant  
Gulf Power Company

- LEGEND**
- ⚠ FOG TIP - 250 GPM EA
  - ⚠ FOG TIP - 100 GPM EA
  - ⚠ FOG HEAD - 24 GPM EA
  - ⚠ FOG HEAD - 28 GPM EA
  - ⚠ FOG HEAD - 34 GPM EA
  - ↔ CHECK VALVE
  - ↔ CONTROL VALVE
  - ▢ STRAINER - 20 MESH
  - ▢ 1½" DOUBLE HOSE VALVES
  - ▢ 1½" SINGLE HOSE VALVES

stantly kept under static pressure by means of a tie into the water tank on the boiler room roof. A check valve is located in the tie line to prevent back flow into the roof tank when the fire pumps are started.

The lines from the transformer control stations to the fog tips and the lines from the turbine room control stations to the fog heads are dry. Each of these lines has been equipped with a removable strainer to catch the rust, pipe scale and dirt that will collect in them. The strainer holes are slightly smaller than the outlet orifices so that any trash passing through the strainer will also pass through the orifices. To obtain an effective fog coverage the outlet

orifices must be clean at all times.

Due to the large quantities of oil involved, the main power and station service transformers present the principal fire hazards in the switchyard. The water requirement for their protection is high. A new and simplified method of fog application is used for protecting the transformers.

Relatively few large capacity, deluge type fog tips are employed as compared to the multiplicity of small capacity fog heads normally associated with the conventional "Bird-Cage" application. In the case of the main power transformers, five 100 gpm fog tips (6 FOA-100) are used to provide an adequate coverage pattern and ample water capacity. Two 250 gpm fog

tips (6 FOA-250) are applied on each of the station service transformers.

Control valves for the transformer fog systems are located in the switchyard approximately one hundred feet away from the transformers. The risers to the transformer fog tips are provided with  $\frac{1}{4}$ " open drains at ground level to assure complete drainage after each use, thus protecting the pipes from freezing. The amount of water lost through these drains is negligible.

Twin 1½" hose outlets are strategically located in the switchyard for connection of 1½" hose lines with fog nozzles. These outlets provide protection for other outdoor equipment containing oil,

such as oil circuit breakers and instrument transformers and also provide a source of water for "mopping up" operations around the transformers.

The hose outlets located outside the building are under pressure at all times and cannot be drained for protection against freezing. These connections and also the control valves which are above the ground are protected with frost-proof insulation.

Due to the character of failures experienced on oil circuit breakers, fixed fog protection was not considered advisable. A severe oil circuit breaker failure very often results in a tank explosion, thereby scattering oil over a wide area. Such a fire is best handled by hand lines with fog nozzles. A fixed fog system would likely be rendered useless by an explosion.

Fixed fog systems are installed indoors for the protection of the turbine oil reservoir, the hydrogen seal oil unit and the turbine oil conditioner of each unit, also the turbine oil storage tank, which is common to both units. Control valves for these fixed fog systems are located below the electrical control room floor. Extension stems on these valves make them operable from the electrical control room. The valve controls are located adjacent to exit doors to the switchyard so as to make them accessible even under the most adverse conditions.

The hydrogen seal oil units present a hazard which is well defined as to area. Four 28 gpm (B-28) fog heads, each of which produces an umbrella shaped pattern having minimal projection value and a large area coverage, are arranged so that their discharge patterns overlap to envelop the entire hazard in a dense fog.

Hydrogen cylinders for filling the hydrogen cooled generators at most plants are located in the basement of the turbine room near the hydrogen seal oil unit. Cylinders so located create an additional fire hazard and also create a problem of replacing the cylinders since they have to be lowered from ground level to the condenser pit. The hydrogen cylinders are located outside the turbine room



FOG TIPS in operation over 45,000 kva power transformer.

and protected from the weather and sun by suitably ventilated enclosures.

The turbine oil reservoirs are located on an intermediate floor between the operating floor and the condenser pit. These reservoirs present a hazard which is difficult to protect because the origin, shape or extent of a fire around them cannot be predicted accurately.

The reservoirs extend below the floor level and are surrounded by grating. It is important that fire be prevented from reaching the reservoirs from the outside and likewise any fire originating at the reservoirs must be prevented from spreading. Six 24 gpm (D-24) fog

heads, each of which produces a narrow fan type pattern, are arranged so that their discharge patterns form a curtain of fog around the sides of each reservoir. Flame will not penetrate this curtain and the fog will tend to keep the tanks cool.

The turbine oil conditioners are located on the condenser pit floor, immediately below the turbine oil reservoir. Due to their relative location, the coverage pattern and type of fog head applied to the turbine oil conditioners were selected to best protect the well defined hazard presented by them and also act against possible oil spill fires from the reservoirs above. Eight 34 gpm (5DP-34) fog heads which have good projectional characteristics are arranged to envelop each oil conditioner and a large surrounding area in a blanket of fog.

The turbine oil storage tank, from a hazard point of view, is not too severe a risk by itself. Neither high oil pressures nor elevated temperatures are encountered. However, to prevent any damage from a fire in close proximity, four 28 gpm (B-28) fog heads have been arranged over the tank to cool and to isolate it.

The coal handling system is protected at two locations by fixed fog systems. In the boiler house two 34 gpm (5DP-34) fog heads are applied at the conveyor transfer point. The control valve for

(Continued on page 109)

#### EQUIPMENT SUMMARY

**Water Tank**—150,000 gallon capacity tank; Chicago Bridge & Iron Co.

**Fire Pump**—Hale Type CLFV gasoline engine driven; Hale Fire Pump Co.

**Fire Pump**—Worthington Model 4L-13 motor driven; Worthington Corp.

**Control Valves**—Chapman Valve Mfg. Co.

**Hose Valves**—Crane Company

**Fog Tips, Fog Heads, and Fog Nozzles**—Fog Nozzle International, Inc.

**Fire Hose**—Cotton jacketed, rubber lined; U. S. Rubber Company

**Fire Extinguishers**—Chlorobromomethane (CBM); Stop-Fire Inc.

**Portable C-O-TWO extinguishers and fixed C-O-TWO fire protection systems**; C-O-TWO Fire Equipment Company

**Signs**—Enamelled; for control valves and portable extinguishers; George Steere and Sons

**Economy and efficiency . . .**

## Electric Motor Drives

*Three more Baltimore, Maryland, plants discard antiquated power generating units in favor of motor drive. Large hospital converts to a-c and purchased power.*

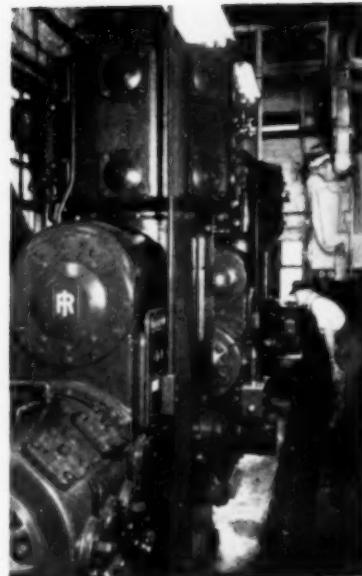
**Case study data and photos courtesy General Sales Division Consolidated Gas Electric Light and Power Company, Baltimore**

**Koppers Company, Inc.**—A relic of a more leisurely industrial era went to the scrap heap when Koppers Company, Inc. (Metal Products Division) discarded a steam-driven air compressor which had been in use for nearly half a century. Two new compressors were

installed in its place, each driven by a 200 hp synchronous motor.

The steam equipment had been retained on a standby basis in connection with three motor-driven compressors installed in 1917. George W. Norris, Jr., Superintendent of Koppers' Service De-

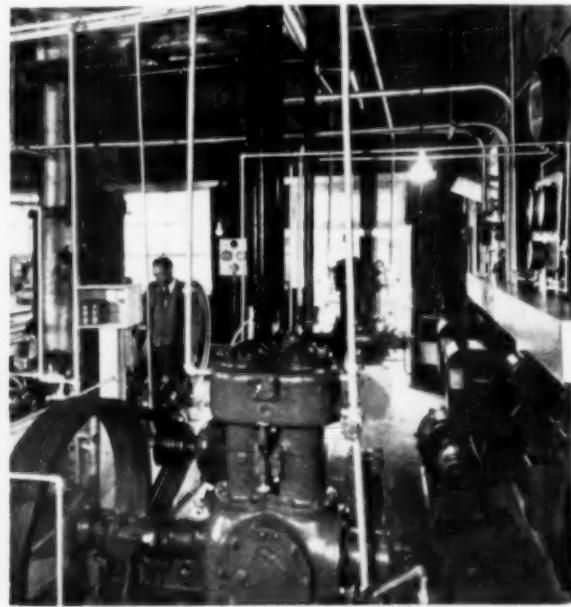
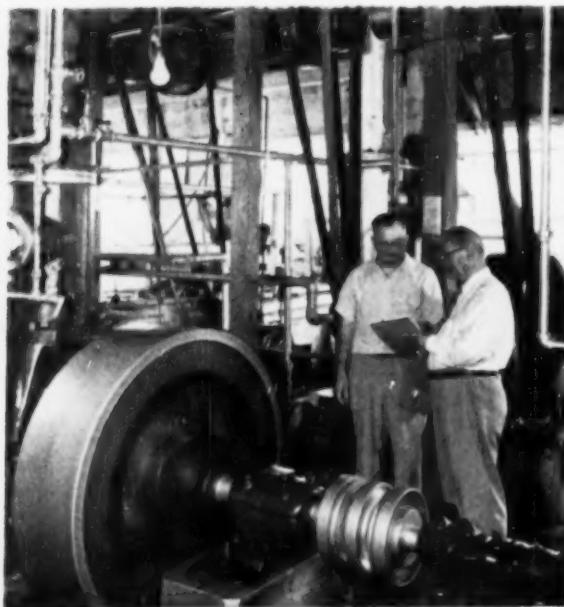
**BELow**—Photo at the left was taken prior to the changeover at Woodfield Fish & Oyster Company. William R. Woodfield (left), Senior Partner, and J. Ashton Devereaux, Consolidated's industrial power engineer, discuss plans for the removal of the old engine drives. Photo at the right is of the same room showing motor installation which replaced belted engines on the ice making and refrigeration machines. Note cleaner and safer working conditions after removal of belting and pulleys.

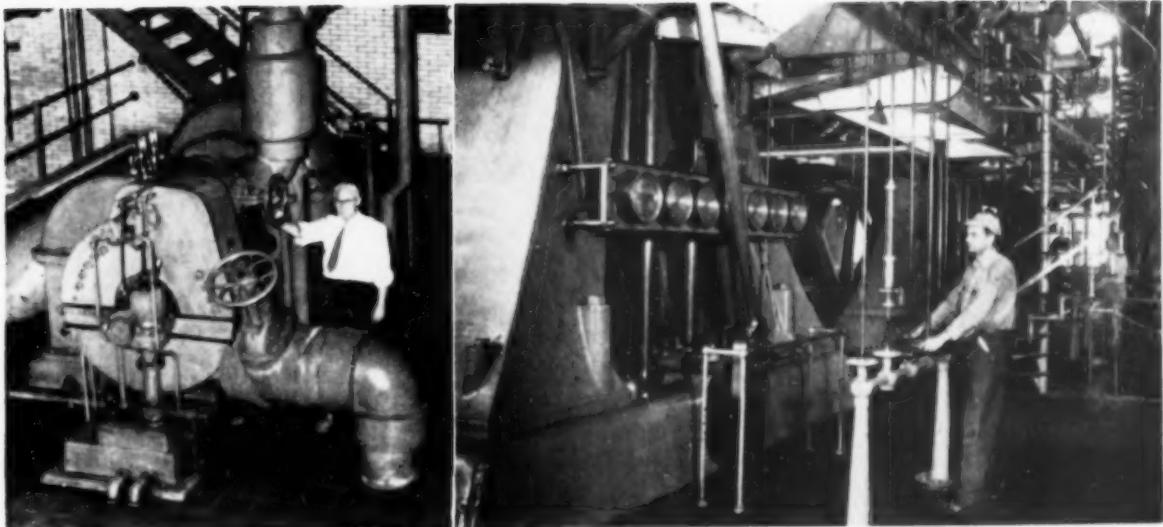


TWO NEW compressors, each driven by a 200 hp motor, were installed at Koppers Company to supply requirements at the Bartlett-Hayward plant.

partment, says age had cut the efficiency of all the old compressors almost in half, and they could no longer meet today's production requirements.

The two new compressors, each with a rated capacity of 1,165 cfm, now carry the full load at Koppers' Bartlett-Hayward Plant, and the three old motor-driven units are being held for standby use.

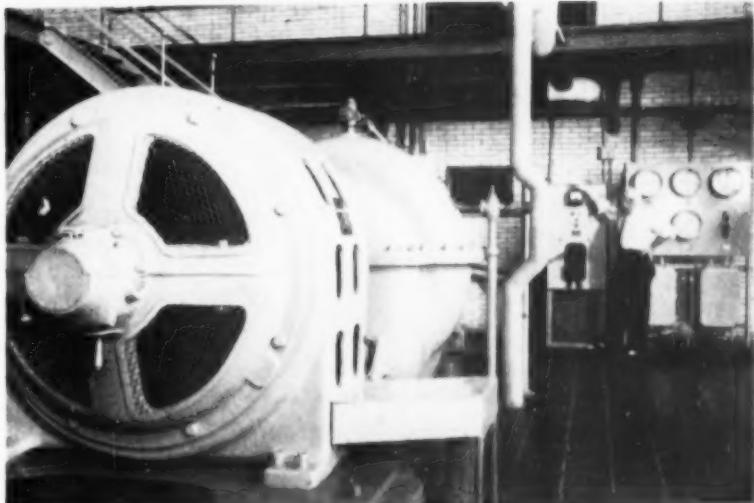




**ABOVE—H. S. M. Baker, Superintendent of Baltimore's main Sewage Pumping Station, is shown with the old steam turbine shortly before it was scrapped in favor of motor drive.**

**ABOVE, RIGHT—**Operators had to keep close watch on the old steam engines. Many manhours are being saved with the conversion.

**RIGHT—**This motor-driven pump replaced the steam turbine-driven unit shown above. Mr. Becker checks ammeter on control panel for the new 450 hp motor.



**Woodfield Fish & Oyster Co.—**The replacement of two 55 hp diesel engines at this Galesville, Maryland, plant, was the final step in converting the operation to 100% purchased power. Growth of the frozen food business resulted in several expansions. However, the original refrigeration machinery for making ice and for fresh seafood storage continued to operate from diesel engines that dated back to the early twenties. Woodfield's all-electric operation is now showing a definite economy as compared with the former method.

**Baltimore's Sewage Pumping Station—**The Eastern Avenue Station is the largest of its kind in Baltimore, Maryland, handling about 30% of the sanitary sewage flow.

First candidate for the scrap heap at this station was a non-condensing steam turbine driving a centrifugal pump rated at 30 million gallons per day. It has been junked and a 450 hp motor has taken its place. Because of the high cost of operating the steam turbine-driven pump, it had been used only as a standby unit while the three other pumps driven by steam engines carried the main load.

Now that one pump has been converted to motor drive, it is being used as the basic unit in the station. During part of the day it is the only pump in use. The new motor and pump are much easier to service and maintain, and re-

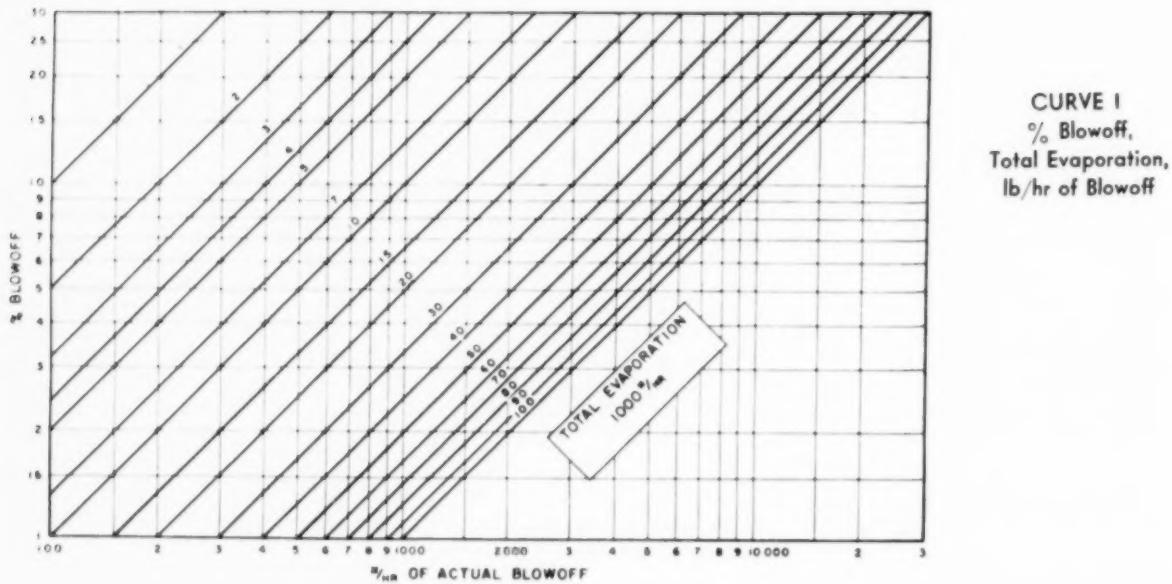
placement parts can be quickly obtained.

Plans are now under way for the replacement of the remaining steam equipment consisting of three huge reciprocating engines driving pumps having a rated capacity of 27,500,000 gallons each, per day.

All sewage pumping stations are under the supervision of the Bureau of Sewers; John J. Hunt is Sewerage Engineer, and C. E. Keefer, Deputy Engineer. Henry S. M. Becker is Superintendent of Pumping Stations.

**St. Agnes' Hospital—**Work has been completed on a changeover whereby all lighting and a major

(Continued on page 74)



## How to Calculate Btu Savings from Continuous Blowoff Heat Recovery

EVERY boiler plant must take precautions to recover waste heat to reduce operating costs. The practice of blowing off even very small and low pressure boilers—as well as large, high pressure plants—intermittently and by hand is intolerable in these days of high fuel and labor costs.

In most cases, continuous blowoff heat recovery equipment, as installed, pays for itself in fuel savings in less than three years, and, in some cases, in less than two years.

**I. Determine the total dissolved solids in the makeup in ppm and choose the allowable concentration in the boiler in ppm from the following chart based on ABAI standards:**

Maximum Permissible TDS in Boiler Water for Various Pressures

Boiler Pressure, psig	Total Dissolved Solids, ppm
0- 300	3500
301- 450	3000
451- 600	2500
601- 750	2000
751- 900	1500
901-1000	1250
1001-1500	1000

Suggested Limits Sometimes Recommended by Experts

**By V. J. CALISE**

Director, Research & Development  
Graver Water Conditioning Co.

For any given boiler plant, you can quickly obtain the annual savings in millions of Btu per year resulting from the recovery of heat from boiler blowoff by means of a continuous blowoff system. Merely use this simple, four-step procedure as applied to the accompanying table and curves:

for Maximum Permissible Silica Concentration in Boiler Water for Various Pressures are:

Boiler and Turbine Operating Pressure, psig	Maximum Silica in Salines ppm as SiO <sub>2</sub>
250- 600	40-50
601- 900	20-30
901-1200	10-20
more than 1200	less than 5-10 and less than 1 above 1800 psig

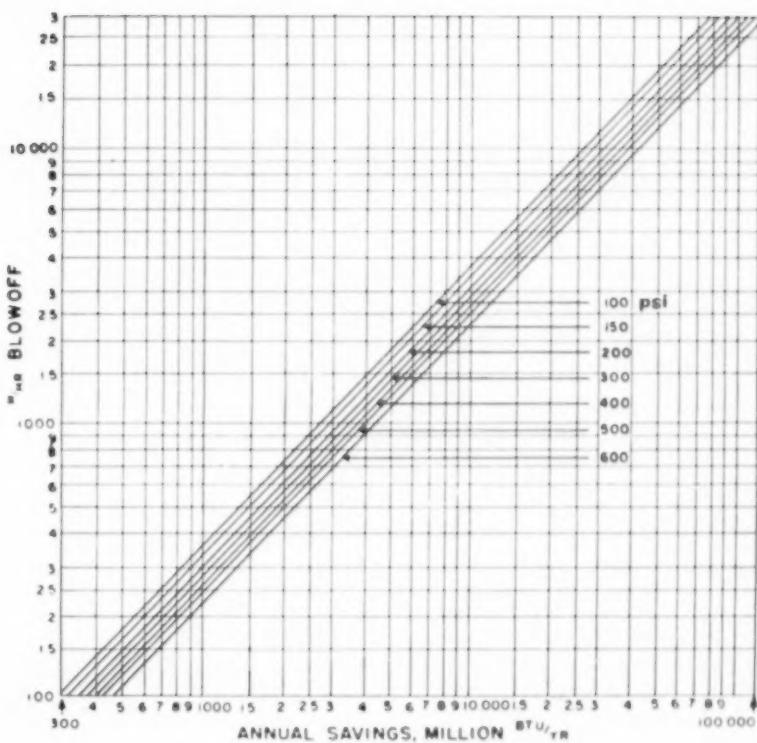
For high-pressure boilers, particularly where turbines are used with condensers for very low-pressure steam discharge, the maximum permissible silica concentration in the boiler water is usually set by the power engineer or consultant so that there will be no danger of turbine blade silica deposits.

These values are subject to change based on operating experiences in the field and new experimental data.

## CURVE 2

lb/hr of Blowoff,  
Boiler Pressure,  
Annual Savings

TABLE I TOTAL DISSOLVED SOLIDS — ALLOWABLE CONCENTRATIONS — % BLOWOFF Based on 100% Makeup						
TOTAL DISSOLVED SOLIDS PPM	% BLOWOFF OF TOTAL EVAPORATION					
	ALLOWABLE CONCENTRATION, PPM					
	1000	1250	1500	2000	2500	3000
10	1.0	0.8	0.7	0.5		
15	1.5	1.2	1.0	0.8	0.6	0.5
20	2.0	1.6	1.4	1.0	0.8	0.7
25	2.6	2.0	1.7	1.3	1.0	0.8
30	3.1	2.5	2.0	1.5	1.2	1.0
40	4.2	3.2	2.6	2.0	1.6	1.3
50	5.3	4.2	3.4	2.6	2.0	1.7
60	6.4	5.0	4.2	3.1	2.5	2.0
70	7.5	5.9	4.9	3.6	2.9	2.4
80	8.7	6.8	5.6	4.2	3.3	2.7
90	9.9	7.8	6.4	4.7	3.7	3.1
100	11.1	8.7	7.2	5.3	4.2	3.4
125	14.3	11.1	9.1	6.7	5.3	4.3
150	17.7	13.6	11.1	8.0	6.4	5.3
200	25.0	18.8	15.4	11.1	8.7	7.2
250	30.0	20.0	14.3	11.1	9.1	7.7
300	35.0	25.0	17.6	13.6	11.1	9.4
400	40.0	30.0	25.0	19.0	15.4	12.9
500	50.0	40.0	35.0	25.0	20.0	16.7
600	60.0	50.0	40.0	30.0	25.0	20.6
700	70.0	60.0	50.0	40.0	35.0	25.0



2. From table I, find the percent blowoff of the total evaporation. This table is based on 100% makeup. If the makeup is less than 100%, use this formula to calculate the blow-off in pounds per hour:

$$\text{Blowoff} = \frac{(\text{Makeup Solids})}{(\text{Max. allowable boiler TDS}) - (\text{Makeup Solids})} \times (\text{Makeup for evaporation})$$

### EXAMPLE:

Boiler pressure = 475 psi  
Total evaporation = 100,000 lb/hr  
Makeup solids = 250 ppm  
Blowoff solids = Max. allowable boiler TDS  
2500 ppm according to ABAI

Condensate returns = 50% of total evaporation,  
or 50,000 lb/hr  
Makeup for evaporation = 50,000 lb/hr

$$\text{Blowoff} = \frac{250 \times 50,000 \text{ lb/hr}}{2500 - 250} = 5500 \text{ lb/hr}$$

$$\text{Total Makeup} = \text{Makeup for evaporation} + \text{blowoff} = 55,500 \text{ lb/hr}$$

$$\text{Feedwater} = \text{Condensate returns} + \text{total makeup} = 105,500 \text{ lb/hr}$$

For determining the blowoff based on maintaining a given silica concentration in the boiler salines with a

given silica concentration in the treated makeup, use this formula:

$$\text{Blowoff} = \frac{(\text{Makeup Silica})}{(\text{Max. allowable silica}) - (\text{Makeup Silica})} \times (\text{Makeup for evaporation})$$

3. Using Curve 1 and knowing the total evaporation, determine the actual pounds per hour of blowoff.

4. Using Curve 2 and knowing the boiler pressure, determine the approximate annual savings in millions of Btu per year. The actual dollar savings per year can then be calculated for each plant. This curve is based on 75% boiler efficiency. For other efficiencies, multiply result by proper ratio.

### EXAMPLE:

Boiler pressure: 400 psi

Total dissolved solids in makeup water: 90 ppm

Amount of makeup: 100%

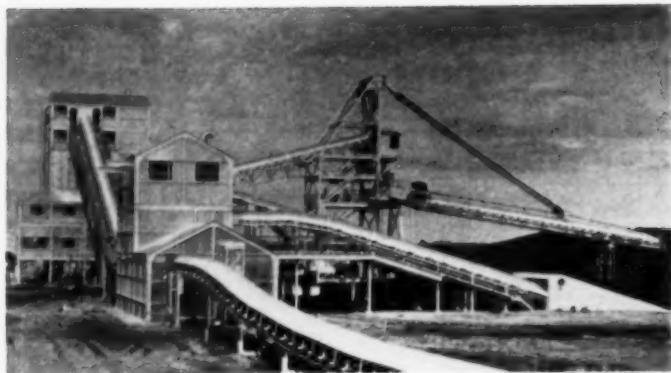
Total evaporation: 50,000 lb/hr  
Allowable concentration: 3,000 ppm

From Table I,  
Blowdown = 3.1%

From Curve 1,  
Blowdown = 1,550 lb/hr

From Curve 2,  
Annual Savings = 5,500 million  
Btu/year

# LIGNITE Provides Power for Alcoa—Texas



Portion of lignite conveying system at Rockdale.

THE feasibility of using processed Texas lignite as a fuel for large-scale generation of electricity was brought to Alcoa's attention by Texas Power & Light Company, which had sponsored investigation of new developments in the fuel technology of lignite in cooperation with the United States Bureau of Mines, at Denver, Colorado.

The existence of large deposits of lignite in the Milam County area of Texas had been known for many years. The available reserves were apparently sufficient to supply fuel needs of a large aluminum plant for many years. In addition, the Texas Power & Light Company indicated its ability to supply enough power in the area for partial operation of an aluminum smelter on an interim basis, if part of the smelting facilities were to be erected and ready for operation before generating facilities could be completed.

Although the economics of lignite-generated electric power for aluminum smelting had not been commercially established, Alcoa felt there was enough promise in the new technology to make a pioneering venture worth the risk. Accordingly, the decision to build at Rockdale, in the heart of Milam County, was taken.

By the fall season of 1951, construction was under way on Alcoa's Rockdale Works. Approximately one year later, in November, 1952, the first aluminum was produced in one of the potlines utilizing interim electric power supplied by the Texas Power & Light Company.

The Rockdale smelting plant includes four potlines in which a total of 90,000 tons of aluminum can be produced annually; an auxiliary plant for the manufacture of carbon electrodes consumed in the electrolytic aluminum smelting process; also there are casting and shipping facilities, shops,

a laboratory, and administrative offices.

All four of the Rockdale potlines are currently in operation and all of the power requirements are now being generated on the site.

Initially, the power-generating facilities are being supplied with lignite which has been crushed and dried for use directly as fuel for the boilers. It is hoped that eventually it will be commercially possible to obtain valuable tars from the lignite before it is burned, by means of a low-temperature carbonization process developed at the United States Bureau of Mines laboratories, Denver, Colorado, by Mr. V. F. Parry. Pilot operations in connection with this carbonization process are now being conducted at Rockdale. Chemical by-products would be recovered from the tars by distillation, and the remaining "char" would be used as fuel for power generation. It is eventually hoped thus to reduce power production costs so that the Rockdale Works can be competitive with other aluminum smelting facilities using electricity generated by hydroelectric or natural-gas-fueled power stations.

## Power Highlights—Alcoa's Rockdale Works

► Aluminum Company of America's Rockdale Works in Milam County, Texas, is the world's first aluminum smelting plant to use lignite as fuel for power generation.

► Power-producing facilities, known as the Sandow Power Plant, are being operated for Alcoa by the Industrial Generating Company, an affiliate of Texas Power & Light Company. When completed, the power plant will have three steam-powered generating units, each with a rating of 80,000 kw. Two units are now operating; third unit is expected to be ready by mid-1954.

► Lignite has a high moisture content and must be dried by a special process before burning. It is hoped that eventually it will be possible to obtain tars of commercial value from the lignite before the remaining "char" is used for fuel, by means of a low-temperature carbonization process developed at the Bureau of Mines in Denver.

► Initially, the boilers are fired with dried lignite, rather than lignite "char" which is the end-production fuel after carbonization.

## About the Lignite

The Milam County lignite which is being used in the Sandow Power Plant is characterized by low heating value, relatively high ash content, and high moisture content. This penalizes transportation of such material, which is why Alcoa's Rockdale Works has been built close to the lignite deposits. The fuel will be dried before use.

The removal of overburden above lignite seams at Rockdale is done

with four enormous dragline excavators. The lignite is loaded by power shovels into a fleet of trucks, each of 62 cu yd capacity, which transport the fuel from the mine to a conveyor belt system. The trucks are equipped with specially built aluminum bodies, which are highly resistant to the acid corrosion of lignite.

The conveyor belt system which delivers the fuel to the plant site is nearly 3½ miles in length, and it is designed to have a maximum capacity of more than 1,000 tons of lignite per hour. The rubber conveyor belt system at Rockdale is one of the world's longest overland conveyors in operation today. The gallery structure carrying most of the belt and idler system is made of structural aluminum shapes, and the tilting covers which shield the system are also fabricated of aluminum.

Lignite is deposited in nine storage silos by the conveyor belt system and is then carried to hammer-mill crushers which reduce it to usable size ( $-1\frac{1}{4}$ ) for the drying process. The finely crushed lignite is stored in continuous-pour silos until required. From these silos the raw lignite is conveyed through the drying operations by a pneumatic transport system.

#### Prototype Carbonizer

A prototype carbonizer, together with its auxiliary equipment and an experimental tar-condensing system, has been erected at Rockdale and will be operated for several months to test the design and to produce tar for research market studies. The experience gained from the operation of this carbonizer will provide indications of the economics of the carbonizing process on a semi-commercial scale and will provide information on the best design for a full-scale carbonization plant.

#### Steam Generating Equipment

The three steam-generating units are each designed to produce 800,000 lb/hr at 1,550 psig, when firing either lignite or lignite char. The steam-generating units are of the continuous slag tap type and are fired tangentially. Each unit is equipped with 12 fixed burners, and provisions have also been made for

Process for drying lignite to be used at Rockdale was developed by the Bureau of Mines in cooperation with TP&L and Alcoa. This method and also the process for carbonizing the dried lignite has been named the Parry Process, for Mr. V. F. Parry of the Bureau of Mines, who invented it.

Crushed raw lignite is moved from the storage silos by a pneumatic closed-loop conveyor system and brought to a hopper located above a screw feed in the drier. Drying process is summarized by Mr. Parry as follows:

"Products of combustion at about 1500 F. (produced by combustion of dried lignite dust with air and recirculated gases) enter the drier section at a pressure of about  $\frac{3}{4}$  psig. The wet lignite is suspended in this drying column in a turbulent state. The fuel to the furnace is regulated automatically to produce a given temperature at the exit of the drying section. Normally this temperature is about 300 F. when the stack temperature is 275 F.

"About 94% of the dried dust settles out in the primary separator, and the balance of the dust is separated in the secondary cyclone separator. The fine dust from the cyclones is returned to the furnace for combustion. The dried dust from the primary

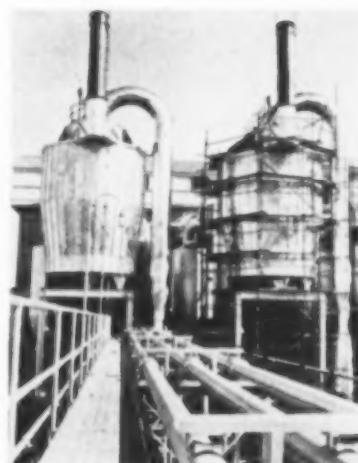
burning surplus process gas produced in carbonizing operations.

Each unit has aluminum drum-end walk-in housings, and the walkways, platforms, stairs and handrails are also of aluminum.

Two low-pressure U-tube feed-water heaters are used on each unit. The heaters are horizontally mounted and have welded steam connections and flanged condensate connections. Provision has been made for pulling the tube bundle.

An evaporator with a separate deaerating preheater, supplied with bleed steam, is used to supply boiler-water makeup. An outdoor deaerator is mounted on the boiler feed storage tank and is designed to pass 873,000 lb/hr to the boiler feed pump. Condensate storage tanks are of aluminum construction. Three ten-stage boiler feed pumps are installed for each steam unit. Evaporator feed-water is taken from the water supply furnished by the Rockdale smelting plant.

The unit cycle piping system for each steam generating unit is separate, having no interconnection with the systems of other units. Service water, cooling water, potable water, station air, compressed air and instrumentation are interconnected for the entire three unit station, however. The station air, instrument air and vacuum cleaning pip-



FUEL DRYING UNITS—These two lignite dryers were the first put into operation at the Sandow Power Plant.

separator is moved with air to the boiler plant storage silo . . ."

ing systems are made of aluminum. Insulating material for outdoor piping systems is also covered with sheet aluminum.

#### Condensing Water System

Cooling water for the Sandow Power Plant is obtained from an 850-acre lake, artificially created near the plant site for the purpose. To create the lake, it was necessary to erect an earth dam that would provide a bank on the low side. This dam is more than a mile in length. Water is pumped into the lake from the Little River, about 12 miles away, through a 36" reinforced concrete pipeline by three 5-stage electrically driven vertical turbine pumps.

The lake is divided by means of a dyke into two "ponds," which are connected by a canal 6,800 ft in length. The smaller lake receives the condenser water discharge; the canal returns the water to the larger lake, where it cools and can be re-used.

#### Turbine Generators

Each of the three turbine generators at the Sandow Power Plant is set on a reinforced concrete pedestal, 18 ft above ground level. The units are General Electric tandem compound double-flow 21-stage, with a rating of 80,000 kw. Each

(Continued on page 74)

**Power transmission fundamentals  
for the plant engineer ..**

## V-BELT DRIVES

**Comments by JOHN E. HYLER**

MULTIPLE V-BELT DRIVE (right) using 16 belts, drives a rotary kiln drier. Note that the sheaves are made up by using a pair of standard eight-groove sheaves at each end. In this way, stock sheaves may be used (two or three on the same shaft) to make up multiple V-belt drives wherever and whenever it appears advisable.



V-BELT DRIVES have come a long way since first introduced as a means of power transmission. V-belts make it possible to efficiently transmit power between pulleys located on short centers, without use of any auxiliary device such as a belt tightener. This is due to a natural tendency a V-belt has to bulge at its sides when flexed around a grooved sheave. In most cases, a V-belt drive consists of one or more endless belts having a normal cross section of trapezoidal form, operating around a driving and a driven sheave, each of the two sheaves having a sufficient number of grooves to accommodate the number of V-belts used.

Normally, a V-belt is usually made in a true V shape, having its sides perfectly straight. Such a belt, bending around a sheave, however, has a natural tendency to bulge at the sides. The V-shaped grooves in the metal sheaves have straight sides. Consequently, as a V-belt bulges in flexing around such a pulley, the bulging causes high-pressure contact between the sides of the belt and the sides of the sheave grooves. This results in a very strong grip, which efficiently transmits power.

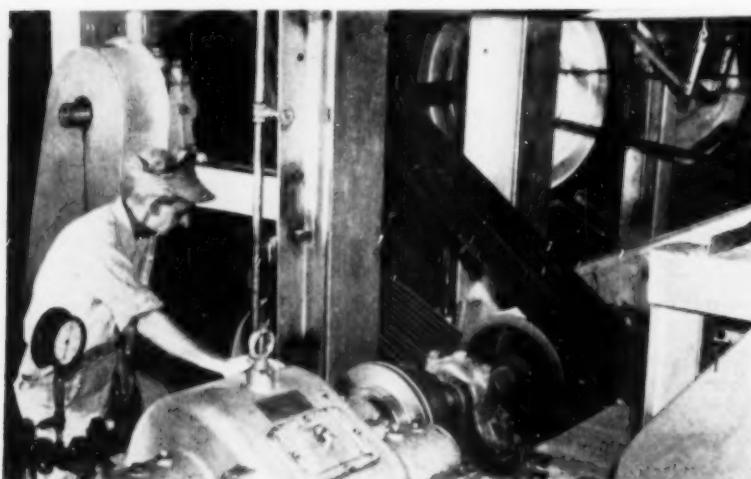
On the other hand, some engineers feel that the normal bulging effect of a perfectly-straight-sided V-belt is too great to result in the

highest degree of efficiency. As a result, some make V-belts with their sides slightly concave, instead of perfectly straight. When such a belt bulges as it passes around the groove sheave, the normally-concave side of the belt in some degree compensates for the bulging action. Therefore, grip obtained on the pulley by the belt is more uniform over the groove walls.

### **Many Advantages**

V-belt drives are simple and easy to install. They require little maintenance. No lubrication or belt dressing is ever employed on such belts. If properly installed and used, they provide a smooth and dependable drive with long life.

Sheaves used in V-belt drives are in some cases made of gray iron castings, properly machined and balanced. In many instances they are fabricated from pressed steel plates, welded together. The V-belts themselves are chiefly of



HIGH-CAPACITY multiple V-belt drive using twelve belts. This drive operates a 300 hp lineshaft and six sugar centrifuges in a Louisiana plant.

PHOTOS — Ice-machine drive illustration courtesy the Dayton Rubber Company. All other illustrations courtesy Allis-Chalmers.

rubber, but generally contain uniformly spaced, hard twisted cords, usually of rayon. In addition, a cover is applied to a V-belt, which helps to hold it in shape, to protect it from moisture and abrasives, and to provide longer wear than such a belt could otherwise have.

While V-belts may be efficiently run on shorter pulley centers than flat belts, (if we postulate a drive in which no wrapper pulley or belt tightener is used) it does not follow that very short V-belts should be employed unless there are specific reasons in connection with the drive, which forbids use of longer pulley-center spans. On multiple V-belt drives, it is always a point in good practice to match the belts for length as closely as possible.

#### V-Belt Lengths

Manufacturers of V-belts have facilities for checking lengths of finished V-belts precisely. They have a system of marking belts, which enables them or their customers to match a number of belts so they can be run together to high advantage on the same drive. It is usually somewhat more difficult to match very short V-belts properly, because slightly-greater differences in belt lengths are allowable where longer belts are being employed on a multiple-belt drive.

In any case where a multiple V-belt drive is being installed, care should be employed to position the driving and driven shafts in perfect parallelism. They should also be positioned so the belts are running at precise right angles to the shafts. Unless V-belts leave one pulley and approach the other at a perfect right angle to the shafts on which the sheaves are mounted, belt wear will be greatly increased, and efficiency of the drive will be greatly lowered.

V-belts may be either under-tensioned or given too much tension, though bulging action of such belts in their sheave grooves allows them to pull efficiently with considerably less tension than is needed for most flat belt drives. If V-belts are run too tight, they

will have a relatively short life. If run too loose they will slip in the sheaves. This will produce rapid wear and consequent short life. Within limits, one cannot expect long life of V-belts on a multiple V-belt drive where some of the belts are any considerable amount shorter than others. In such a case, one cannot set the pulleys on center distances that will properly tension the looser belts without bringing the shorter belts too tight.

#### Eliminate Sag

However, one must not get the idea that enough take up of V-belts cannot be employed to eliminate slight amounts of sag, which may occur in one or more of a number of belts in a drive. If one has purchased a matched set of belts, or has conformed with the recommendations of the V-belt manufacturer in matching belts for a multiple drive, he may rest assured that enough tension may be placed on those belts to

give them all a uniform running appearance on the sheaves. The longer the V-belt drive involved, the more practical it becomes to apply more tension in the interest of removing all sag from given belts in the drive.

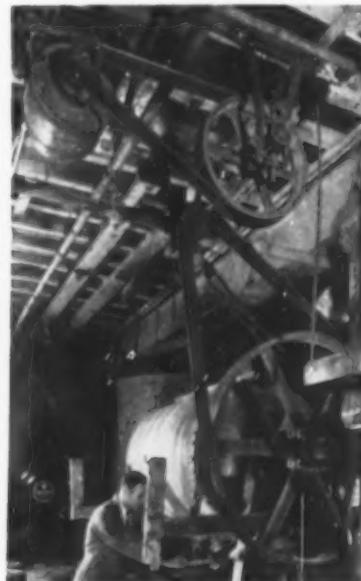
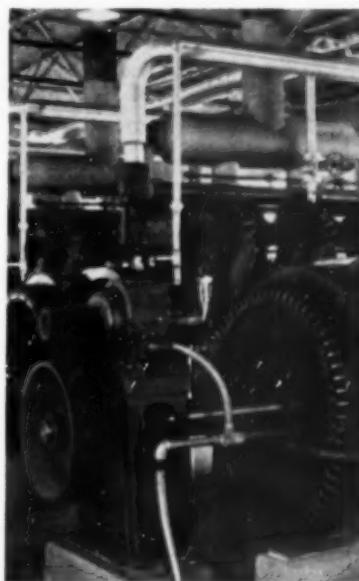
When one is using V-belts on drives of very short centers, it is well to obtain information from the manufacturer of the particular V-belts being used as to the lowest limit (relative to both the smallest pulley diameter and the distance between pulley centers) for which he will recommend his V-belts for efficient performance.

Some V-belts are made with a series of deep undulations on their inner edge, which appear much like gear cogs. The purpose is to allow these belts to flex more readily around small-diameter pulleys and around short pulley-center spans. It is claimed that in general, such belts can be employed to advantage on pulley-center spans at least 25% shorter

(Continued on page 64)

**MULTIPLE V-belt drive operating on one of three 270 hp auxiliary generating units at the Skelly Oil Company, Velma, Oklahoma. These are plain vertical flat belt drives, thoroughly practical with V-belts, where as a vertical flat belt drive is next thing to impossible to keep really efficient without a wrapper pulley.**

**WHEN WE speak of a double-reduction drive, we usually think of gears. However, it is entirely possible to arrange a double-reduction layout through two multiple V-belt drives. Here's one example where a motor, hung from the ceiling, has its speed reduced through two V-belt drives for slowly revolving the pebble mill.**



## (Power Transmission Fundamentals—Continued)

than the standard type of V-belt.

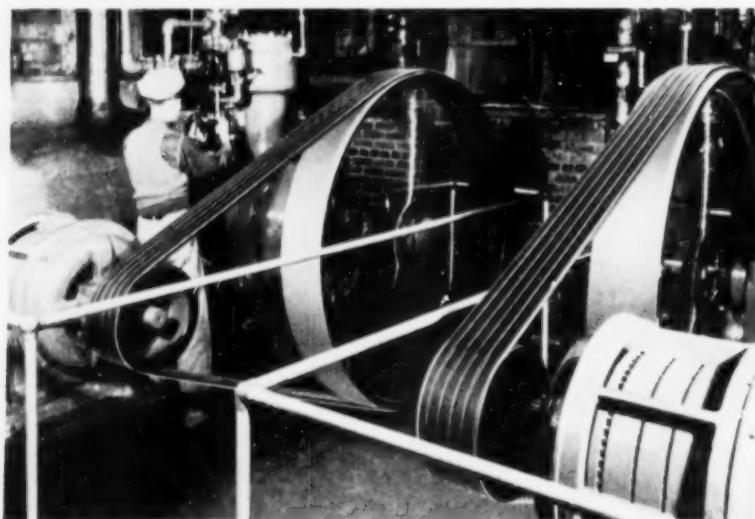
Care should be employed in installation of standard V-belts. It is possible to pry V-belts or turn them over the edges of grooves in the same manner that flat belts are often placed on pulleys, but this is bad practice. It has often damaged or broken one or more of the cords in the belt, and in consequence has reduced its life.

### Allow All Take-Up Adjustment Possible

If at all possible, a V-belt drive transmitting power between a motor and a machine should have the motor arranged so it is near the forward end of the adjustment when V-belts are first placed on their sheaves. At this position, the belts should be quite loose when being placed on the sheaves. This allows one to use practically all available take-up in the motor adjustment for adjustment of belt tension. It also allows belts to be placed on the sheaves or removed from them without forcing them, and without danger of breaking or injuring any of the cords in the belt.

Another form of abuse to which

**IN THE MAJORITY** of cases V-belts operate between two grooved sheaves. However, it is entirely possible and practical to operate them from a grooved sheave on the motor shaft to a flat-faced pulley. This Dayton Rubber Company photo shows multiple V-belts in operation on ice-machine drives.



V-belts have sometimes been subjected to allowing them to set for a long period of time on "down" machines, and to leave them at full tension on the sheaves. If a "down" machine is idle for a long period of time, V-belts tend to take a "set" in the rubber where they have long been stressed into curved form around pulleys.

Therefore, it is wise to loosen any V-belt drive where it is known that it will be idle for a considerable period of time. If for any reason it is not convenient or practical to loosen V-belts under these conditions, one should at least turn the drive over by hand enough to remove the stressed portions of the belts from the sheaves, allowing another portion of the belts to come under stress for a period of time. Turning them over by hand occasionally in this manner will prevent them from becoming "set" in any given portion of their length.

### Checking Speeds

Any V-belt drive may be checked for efficient performance in the same manner as an ordinary flat-belt drive. Through use of a ta-

chometer, it is a simple matter to check the driven shaft speed, setting down a notation of that speed in a convenient place. Driven shaft speed may be checked and compared as often thereafter as one may care to check efficiency of the drive.

Obviously, if at any time the driven shaft shows a speed lower than it had soon after installation of the drive, it indicates an adjustment must be made to slightly increase belt tension. Some slight wear occurs on V-belts. There is also a certain amount of initial belt stretch which must be compensated through adjustment.

While most multiple V-belt drives are made up of belts made endless and matched for length, there are some instances in which manufacturers purchase rolls of open-end V-belt. It is possible to use such belting, cutting it to length and joining it together with special V-belt fasteners. Some have found this is all right on drives of fairly great length, especially in cases where nothing other than belts joined in this way are being used.

### Avoid Non-Uniform Stretch Characteristics

It is always wrong, however, to join one V-belt together with a fastener, and use it along with endless V-belts in order to keep a multiple V-belt drive in operation. Belts made endless and belts joined with fasteners have different stretch characteristics. For that reason they will not allow uniform distribution of the load between the two kinds of belts. There will certainly be fast wear on one or the other of such belts in a drive.

It is almost as bad (when it is found that one or more V-belts in a multiple drive must be replaced) to remove only those belts which are much the worse for wear, and to leave on the sheaves those which still appear to be in pretty good condition. If this is done, it means that old and new V-belts must be mixed on the drive. Again one is faced with the proposition of different stretch characteristics in the two types of

(Continued on page 110)

# HANDLING EQUIPMENT

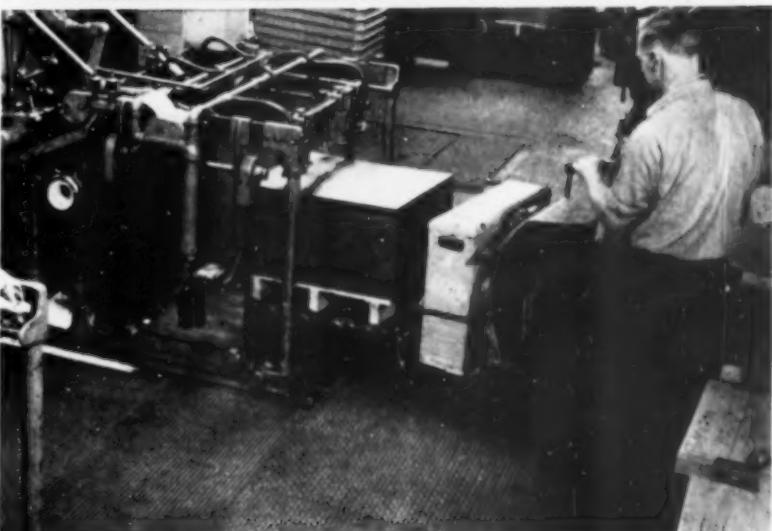
## Boosts Efficiency and Cuts Costs

INCREASED production at reduced costs is achieved by replacing manual handling with mechanized equipment at the Baltimore plant of the Crown Cork and Seal Company Inc., manufacturer of bottle caps used to seal beverages, foods, and dairy products. Four-wheel, manually pushed trucks used in Crown's receiving department, and the manually-operated hand lift jacks previously used in production areas were replaced by modern, mechanized industrial trucks.

ONE MAN does the work of two, and in half the time, at this Baltimore plant, where incoming raw materials are now palletized and quickly moved into production by this Transporter. Formerly, two men were required to manually push four-wheel trucks carrying materials such as this 32-carton, 2,080 lb load.

MECHANIZED equipment, such as this Automatic Transporter electric industrial truck, replaces the manual lift jack formerly used. Transporter moves and places into automatic feeder a 2,400 lb load of tin plate for stamping into crown caps. Older methods required two men, to the present one. Now operator can keep a closer check on each press.

SKID LOADS of sheet metal in the storage area for the screw cap department are handled by this operator-led electric industrial truck which replaces a hand lift jack truck. Old method took 20 minutes to traverse 100 yard distance; and two men were needed. Present travel time is five minutes, with only one operator required.



Photos Courtesy  
Automatic Transportation Co.

# **Protection Against "Single Phasing"**

**Methods: Common current coil, plunger type instantaneous magnetic relay . . open or reverse phase relay . . voltage relays . . and a phase failure relay, depending for its operation upon an unbalance in current rather than voltage.**

**By BEN R. ASKEW**

Mgr., Industrial Power Division  
Georgia Power Company  
Atlanta, Georgia

PLANT engineers have often questioned the reliability of protection given by the standard full voltage motor starter against damage to a three phase motor from single phase operation. One supply line may be opened due to fuse blowing or other causes and the motor fail to start, or it may continue to run if already in operation, and the normal control equipment may not disconnect the motor. They have experienced trouble mainly with 220 volt motors of 15 hp and smaller.

### **Typical Problems**

A small freezer locker cold storage plant, operating with thermostatic control, may blow a fuse when trying to start during the night. The overload protection then must be relied on to disconnect the motor from single phase before its windings are damaged, or the customer is greeted in the morning with a damaged motor and the need for a replacement until it is repaired.

This is more apt to occur when the motor has been stopped for ten or fifteen minutes, the control protective heaters have cooled, and the imbedded motor windings are still hot. When the motor tries to start under these conditions with single phase, the control often will not keep up with the heating of the motor windings.

An air conditioning system

where a motor is operated at its 55 c rise rating and forced cooled will be recognized as another ever present example. Unattended automatic sewage and water pumps, boiler feed pumps, and reversing motor drives for fans on dry kilns are other installations often affected. In the case of the dry kiln, the motor may be located in a warm place which has a different temperature from the location of the control; then it is reversed at specified intervals which may be a partial "plugging" action with its extra high current inrush. This sequence results in little coordination between the control and the motor, and often a damaged motor when operating with single phase.

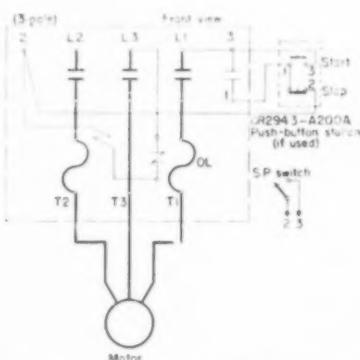
Any damage which results generally costs both money and loss of time while locating and changing to another motor. The time lost may often be of more value than the repair of the motor. A damaged boiler feed pump can cause shutdown of all heat processes in an entire plant.

This question of protection against single phase operation has been discussed with the various manufacturers of control equipment, and the following summary incorporates their comments, and will help explain the problem and means for meeting it.

### **Conventional Starters**

The standard full voltage start-

ing switches used on the motors of 15 hp and less are generally referred to as magnetic starting contactors. The connection diagram of a typical contactor of this type is shown in Figure 1.



**Fig. 1. Schematic wiring diagram of a typical magnetic contactor.**

From the standpoint of single phase protection, the holding coil and its connections, and the overload protection are the principal features involved. When the contactor is closed, the contacts themselves are held together in the closed position by an electro-magnetic coil which is connected to two of the main supply lines.

The overload protection is noted on the diagram as OL. It consists of heater coils connected in two or three of the lines leading to the motor. The heaters are designed to increase in heat with the same

characteristics as the motor windings. Mounted adjacent to these heaters are bimetal or thermostatic strips which become distorted when heated. As the load on the motor increases, the current increases and so does the heat from the heaters; this in turn causes the thermostatic strips to become distorted to such a point as to open the circuit energizing the magnetic holding coil, and the contactor then opens.

The heaters are rated according to amperes, and in steps of a fraction of an ampere for the smaller motors, to steps of near one ampere for motors larger than 5 hp. They are supposed to be selected with due regard to the surrounding temperature conditions, type of duty on the motor, type of load, and the other features which affect coordination of temperatures of two pieces of electrical equipment with their operating conditions. Difficulty has been found in maintaining the necessary coordination under varying load and surrounding conditions, and at the same time give protection against single phase operation. It should be borne in mind that many of the installations to be protected are in small plants where there is no regular technical attendant.

In the example of the reversing fans on dry kilns, the heaters need to be large enough to stand the partial plugging condition, and at the same time be small enough to disconnect the motor when the current in two lines increases due to single phase operation.

The refrigerating equipment mentioned offers another instance of trouble in trying to depend on the heaters to disconnect the motor. The thermostat recloses the contactor, the compressor tries to start under pressure; and when a fuse has opened one line, the motor will not start, and a heating race begins between the relatively cool heaters and the still heated motor windings, with the motor windings often losing the race.

#### Ideal Protector

These illustrations show some of the difficulties encountered when depending on the overload heaters

to clear the motor when single phase is supplied. Proper control to take care of three phase motors under single phase operation must meet the following situations when one circuit is opened:

(1) Should open the supply circuit when the contactor is closed by the magnetic coil receiving full voltage when connected to the two remaining live wires. This operation to function under both starting and running conditions.

(2) Should open the supply circuit when the contactor magnetic coil is connected to one of the lines that opens.

(3) With a motor starting, the induced voltage between the open line and the other two will be near half the full line voltage, and generally the contactor will not close if one of the holding coil connections is attached to the line that is open.

(4) With a motor running, the regenerated voltage between the open line and either of the other two may be as high as 180 volts when 220 volts is supplied. This voltage depends on the load on the motor, and in one test with 208 volts as the supply, the regenerated voltage from a 5 hp motor carrying half load was 156. This will hold many contactors closed when a line is opened while supplying a running motor, though the holding coil is connected to the opened line.

(5) Whatever protection is added against single phasing, should not cost more than rewinding the motor, and preferably should have some method of indicating the motor has been disconnected due to single phase supply.

(6) It should be relatively simple.

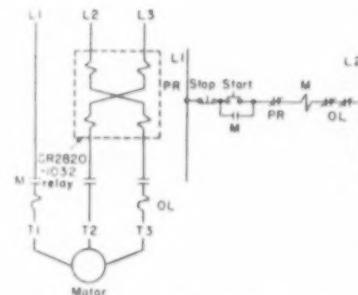
To meet these conditions, four general methods have been used.

Perhaps the oldest and considered first, is the common **current coil, plunger type instantaneous magnetic relay**. This is made in sizes up to 600 amperes. When mounted in a standard Type 1 enclosure, it retails to an industrial customer for \$60 to \$68, depending on the current rating. The relay contacts are connected in the contactor holding coil circuit, and

open this circuit on over current.

For the larger size motors, the current settings can be adjusted so as to operate when the current increases due to one of the three phase lines being opened. For motors of 15 hp or less, the cost and difficulty in adjusting for the low currents has been a hindrance to the use in this application. When used in dusty or oily locations, the plungers and cylinders in which they operate need to be kept clean so the plunger will operate freely.

Another type protector for this use is known as an "**open or reverse phase relay**." Figure 2 shows a picture and connection diagram for this relay, which has a retail price of approximately \$80.



**Fig. 2. Schematic diagram of an open or reverse phase relay.**

With three phase service being supplied, the two current coils are displaced in phase angle 120 degrees, and the disc rotates. This disc turns less than one revolution and strikes a stop where it is held as long as this phase balance relation exists. The contacts of this relay are closed when in this position, and the motor contactor holding coil circuit is thus closed. If one of the lines in which the relay current coil is connected is opened, then the torque holding the disc against the stop is eliminated, and the disc through spring action reverses and opens the contacts in the magnetic holding coil circuit.

Should the line in which there is no current coil open (Line L<sub>1</sub>), the phase displacement of the two remaining coils will be shifted so that the holding torque is also eliminated, and the relay contacts are opened.

The cost of this relay has been

the main hindrance to its use. Little or no trouble has occurred from a maintenance standpoint, and it is fairly simple to use.

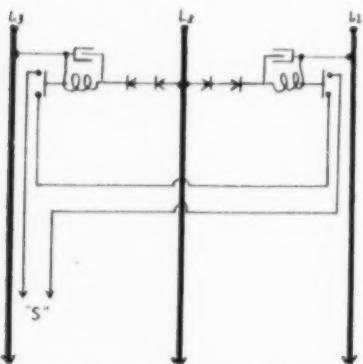


Fig. 3. This scheme uses voltage relays and will stop motor when voltage drops below 200 on one phase. Leads "S" are connected in stop button circuit of contactor.

A third method is available using **voltage relays**. This is shown schematically in Figure 3. With the use of telephone type relays, rectifiers, and condensers, the relay can be adjusted to open when the voltage on one phase drops below 200 volts. The regenerated voltage then will not keep the protective equipment from functioning. The cost of manufacturing, however, was found to be approximately \$60 per relay, and this along with its fairly complicated circuit has made it impractical.

#### Phase Failure Relay

The most recent relay developed for this protection uses a three

legged plate, each leg being placed over a series current coil in one of each three phases. With balanced current, the plate is pulled equally against all three coils. Then with one line opened and the coil in that circuit not carrying current, the pull of the other two coils moves the plate and opens contacts which are in the main contactor holding coil circuit. This relay and its diagram of connections are shown in Figure 4.

The manufacturer states this relay also has the advantage of opening the contacts when the currents are unbalanced as much as 50%.

Another feature of value is a set of contacts which close when the relay operates. This makes possible the use of an alarm or signal from either another source of power or a battery, and will thus indicate when the relay has operated to clear single phase supply. It can thus notify the operator or watchman when the motor circuit is open.

Tests were run with one of these relays connected in the holding coil circuit of a 5 hp, 3 phase motor, driving a centrifugal pump and drawing 14.4 amperes per line at 208 volts. The first test was run with the motor idle, one fuse removed, the safety switch open, and the contactor holding coil connected across the two lines which would have full voltage. The open phase protection relay was connected between the contactor and motor, with its reset switch closing the holding coil circuit.

On closing the safety switch, the contactor closed and immediately dropped open, with the protective relay contacts remaining open.

The next tests were with the motor running at full load and then at half load, and one fuse then removed. The protector relay functioned to open the main contactor in both cases.

Another test used the motor running half load, and a fuse was removed from one line to which the magnetic holding coil was attached. The motor contactor opened. This same test was again run without the single phase protector, and the holding coil of the motor contactor held that switch closed, and "chattered" considerably, 156 volts being measured across the coil.

It will be noted these relays range in size from  $\frac{1}{2}$  hp through 200 hp at 220 volts. They will also apply on 550 volt circuits, and the horsepower each relay will handle will increase in proportion to the voltage.

Each leg of the plate which is held by a current coil has a weight attached for balancing purposes. Cases have occurred where the gravity pull of the weights in some vertical positions would hold the switch open on starting. This can be remedied by shifting the center of gravity of the plate with a small washer under the screws holding the relay in its case.

The price to the average industrial customer for the smaller sizes is around \$56.

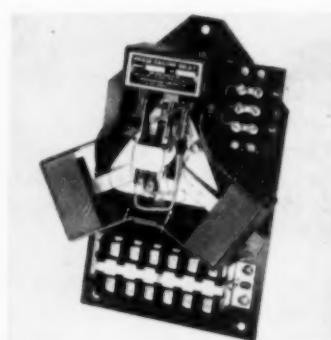
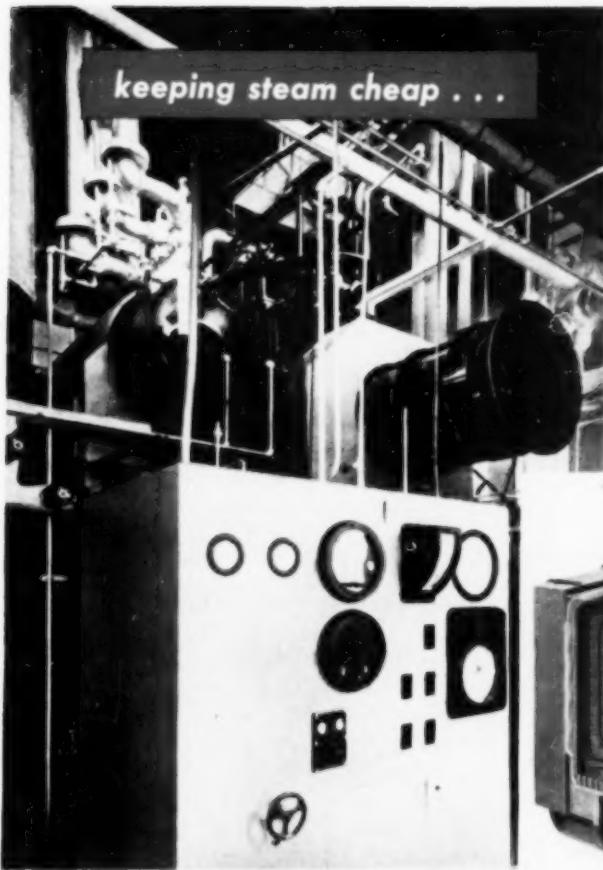


Fig. 4. Tests have shown that a high degree of protection for three phase motors against single phase operation is provided by this Phase Failure Relay. It depends for its

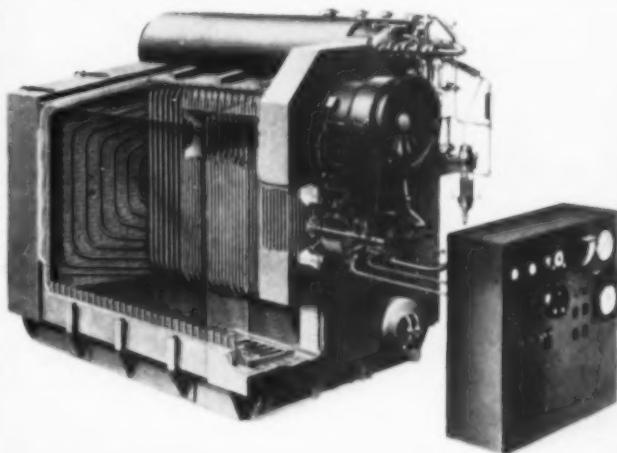
operation upon an unbalance in current rather than voltage and has other advantages. (Photos courtesy Consolidated Electric Co., St. Paul, Minn.)



One of the three B&W FM Boilers at the Buffalo Plant.

**B&W Type FM Boilers  
Provide Economical and Efficient  
Steam Generation  
at**

**AMERICAN - Standard**



Typical arrangement showing sectional view of the FM Boiler and the control panel.

Since replacing five old units more than a year ago, three modern B&W Integral-Furnace Boilers, Type FM, have set and sustained high standards for economy and operating efficiency at the Stamping Plant of the American Radiator & Standard Sanitary Corporation in Buffalo.

Selected on the basis of previous experience with B&W Boilers—both FM and larger types—which are now producing steam at various other plants of the company, this multiple-unit FM installation has pleased both management and plant personnel. Overall boiler operating efficiency is 85%. Each of these versatile, self-contained, B&W units has a steam capacity of 27,500 lb per hr and is equipped with fully automatic controls. Designed for pressures to 250 psi, all three FM boilers are providing high

pressure processing steam as well as steam for heating.

The choice of B&W FM boilers to supply plant steam requirements is an established trend that is putting more and more of these shop-assembled units into service for the broadest variety of industries, utilities, and other users, both here and abroad. Because it offers compact, "package boiler" benefits along with cost-saving big boiler advantages, B&W's FM Boiler is already in service or on order for a total steam capacity of more than 7,000,000 lb per hr. You can get this unique B&W "workhorse" in a range of standard sizes, for loads from 2900 to 28,000 lb of steam per hr at pressures to 235 psi. It is also obtainable for operation at higher pressures.

**Features of  
B&W Integral-Furnace Boiler  
Type FM**

- Saves Erection Time and Cost
- Meets Wide Range of Service
- Handles Quick Load Changes
- Suitable for Outdoor Service
- Safe, Automatic Operation
- Fast Steaming
- Low Maintenance
- Easy Accessibility
- Burns Oil and/or Gas
- Saves Fuel
- Saves Space

Write for Bulletin G-76 which gives complete details of the many cost-saving features of this popular, small boiler. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

G-634

**BABCOCK  
& WILCOX**



*Industry progress report . .*

# Atomic Projects

By JOHN F. LEE\*

Consultant on Atomics  
for Southern Power & Industry



## More Agreements for Atomic Power Studies

THE Atomic Energy Commission has signed separate agreements with Babcock & Wilcox Company, Bendix Aviation Corporation, and American Machine & Foundry Company to undertake atomic power studies. The agreements bring to eleven the number of studies being conducted by individual companies or groups of companies under AEC contracts. The three new study projects will run for one year with all costs borne by the companies.

The Babcock & Wilcox Company has been active in the atomic energy program since the days of the Manhattan Project and maintains an atomic energy division staffed by about forty engineers. Babcock & Wilcox is also a member of an atomic power study team headed by Dow Chemical and Detroit Edison. The present agreement covers the design, development, and manufacture of equipment necessary to the operation of atomic power plants. Ac-

cording to C. H. Gay, vice-president in charge of Babcock & Wilcox's atomic energy division, this company is looking forward to the time when it can assume a position as an equipment supplier to atomic power plants similar to the position it now holds with respect to conventional power plants.

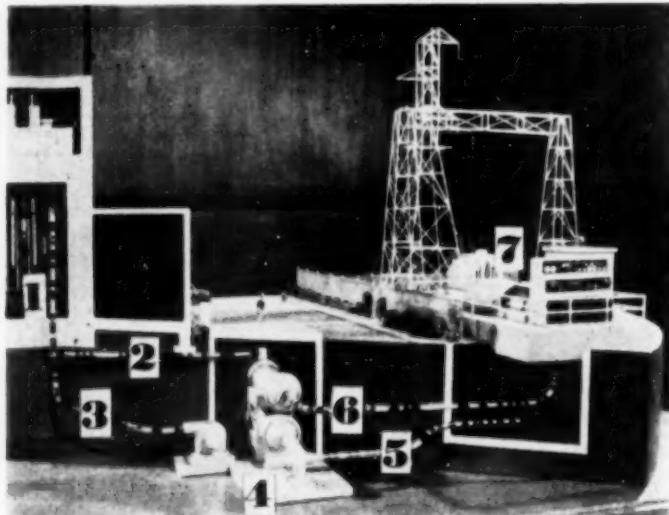
The Bendix Aviation Corporation will study the future of atomic power and new uses for radioactive isotopes or fission products. The study will also embrace new reactor designs for both stationary and mobile power

(Continued on page 74)

## Contract for Second Atomic Power Plant

North American Aviation Corporation has signed an agreement with the Atomic Energy Commission to share the cost of research, development, construction, and an operation test program of two years duration for an atomic power plant having a capacity of 8,000 kw. The entire project is expected to cost \$10,000,000. Of this North American will assume \$2,500,000 including the site, housing, and utilities necessary for the test program. The entire project will be completed in 1958.

This power plant is one of the five atomic power projects recently slated by the Atomic Energy Commission (see page 74, SP&I for June, 1954). The reactor for the power plant has been under study by North American Aviation for some time. It will use a liquid metal, probably sodium, as a coolant. The heat removed from the reactor by the sodium will then be used to generate steam in



MODEL of North American's 8,000 kw atomic power plant. (1) reactor; (2) hot sodium to waste-heat boiler; (3) liquid sodium from sump to reactor; (4) waste heat boiler; (5) condensate to waste heat boiler; (6) steam to turbine; (7) turbo-generator.

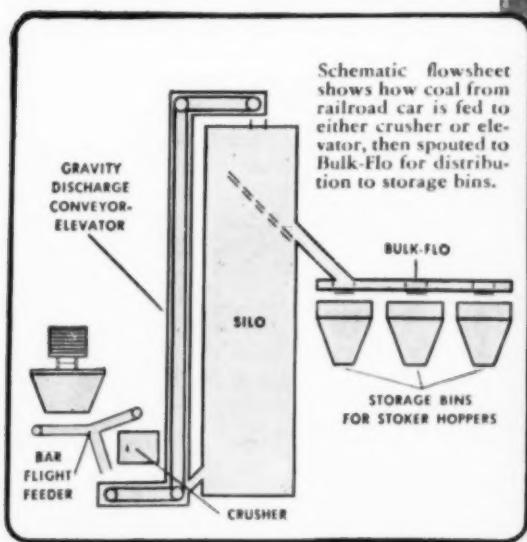
a heat exchanger which operates as a waste heat boiler. A special advantage of this type of power plant is the possibility of high steam temperature without high pressure in the reactor. A further

advantage is that the turbine and allied equipment are not contaminated by radioactivity.

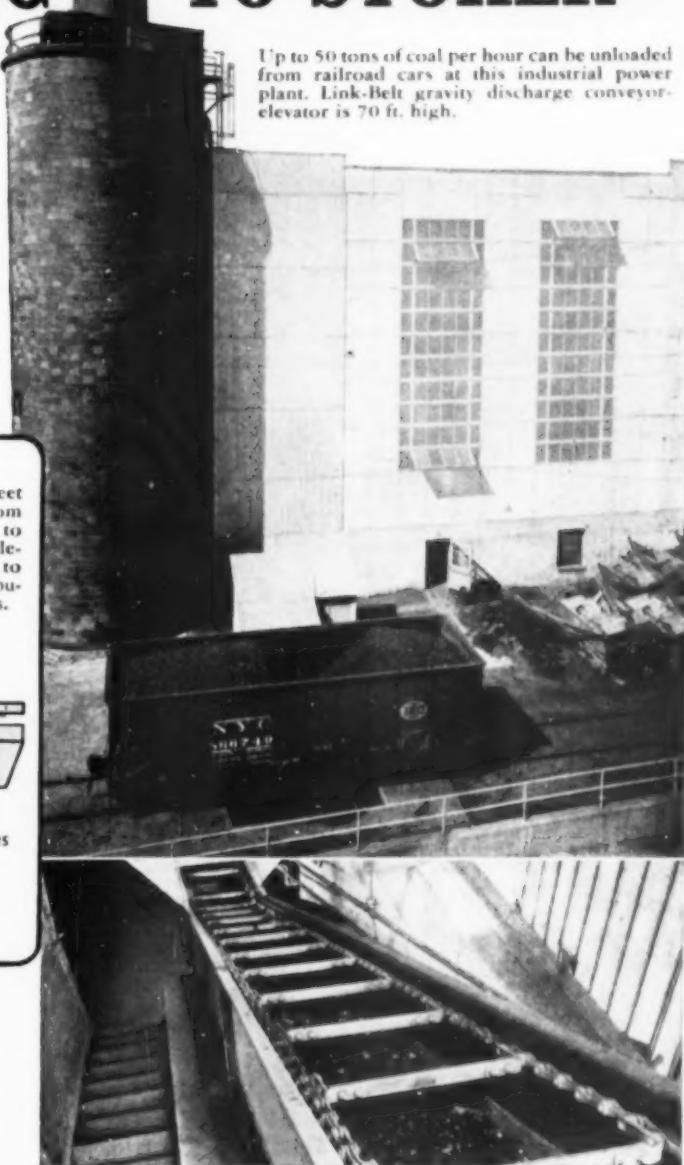
\* Mr. Lee is Associate Professor of Mechanical Engineering, North Carolina State College, Raleigh, N. C.

# FROM SIDING TO STOKER--

it's Link-Belt  
for low-cost  
coal handling



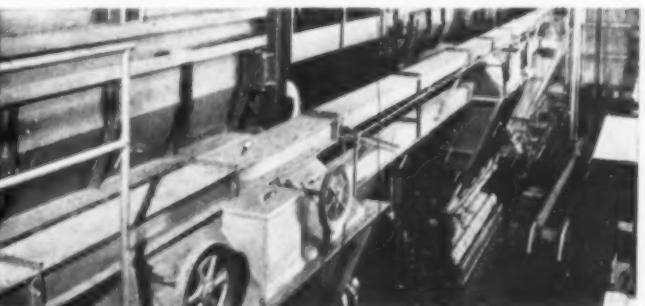
Schematic flowsheet shows how coal from railroad car is fed to either crusher or elevator, then spouted to Bulk-Flo for distribution to storage bins.



Up to 50 tons of coal per hour can be unloaded from railroad cars at this industrial power plant. Link-Belt gravity discharge conveyor-elevator is 70 ft. high.



Simple and effective, this Link-Belt bar flight feeder travels at 45 ft. per min., operates on 45-ft. centers.



Dust-tight Link-Belt Bulk-Flo feeder-conveyor delivers coal to any of three stoker storage bins at 15 tons per hour.

**LINK-BELT**  
COAL HANDLING EQUIPMENT



LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

**Partial cooling better than no cooling . . .**

# Consider COOL AIR TEMPERING

*Since we all can't afford Cadillacs, we buy other makes and accept the limitations of a smaller car. So, why can't we accept partial air conditioning whenever full cooling is economically out of reach.*

WE SHOULD recognize that for many industrial applications full air conditioning will always be out of reach. Why not consider partial air conditioning?

Perhaps partial cooling should be referred to as "cool air tempering" to prevent confusion. In any event, there seems little excuse for not increasing the comfort (and therefore efficiency) of our industrial workers to the maximum extent economically desirable.

**Evaporative cooling** has proved useful for certain load conditions in the more arid areas. It will not be considered herein, however, because it is not satisfactory on humid days, has short life, requires too large an air quantity for economical ductwork, is drafty, and usually increases plant humidity to an undesirable level. Therefore its proper application is limited.

In a like manner **window and package type air conditioners** are usually unsuitable for new industrial applications because of high operating cost per ton, relatively short life (as compared to central plants), and lack of flexibility for economically matching the load. They are very useful, however, for spot cooling in existing buildings.

The use of a single central plant for heating and cooling, in conjunction with circulating water lines and remote air handling units, overcomes most of the dis-

advantages that would be experienced in using package cooling systems in conjunction with separate heating systems. Be sure, when comparing the cost of the two systems, however, to include all flues, gas piping, cooling tower circulating piping and supports, drain piping, insulation, electric service switches and feeders, and heating equipment in your analysis. Neglect of any of these items will improperly favor one system as compared with the other.

We will restrict our consideration of partial cooling to new buildings where it can be combined with the heating system. We can immediately cite the following advantages for partial cooling as compared to full (conventional) cooling:

- (1) Lower central plant tonnage, with corresponding lower piping, wiring, plant, and cooling tower cost.
- (2) Lower operating cost, due to lower demand charges on power, lower cost per hour at full capacity; and with some types of control, a lower number of operating hours.
- (3) Air quantities and circulating water rates can be adjusted for proper heating conditions and left "AS-IS" during cooling season. This results directly from the fact that plant capacity is insufficient to overcool any area. Load

**By JOHN A. WEBER**

Consulting Engineer  
Abilene, Texas

unbalance will result in some unevenness but generally no overcooling. The central plant water chiller can use a reset controller for changing water temperatures for part load operation in a manner analogous to that used for heating.

- (4) Special areas, such as office and sales areas, can be fitted with conventionally sized air handling units and controls for full cooling, without in any way penalizing the remainder of the partial system. (All water lines and air units can, of course, be sized for full cooling; controls, cooling towers—leaving central plant equipment to be added as the demand arises for more cooling.)

Certainly a 90 degree indoor dry bulb with low relative humidity is preferable to humid 100 degree outdoor air; and certainly an 85 degree indoor temperature would be even better. We cannot go below an average indoor temperature of 85 degrees, however, without control difficulty and without reaching the cost and tonnage of full cooling. Load figures can be run for both 85 and 90 degree indoor temperatures and design based on the lowest figure economically possible.

Low humidities make higher temperatures comfortable, so that the latent load will be about the



## THIS PRODUCTION "DOUBLE CHECK" SAFEGUARDS YOUR BOILER INVESTMENT!

■ Yes, here is one extra production step we will never bypass! It is your guarantee of a *dependable*, long-life blow-off valve.

In this corner of the YARWAY Testing Department, every Yarway Blow-Off Valve is hydrostatically tested at  $1\frac{1}{2}$  times its rated maximum working pressure—proved drop-tight for service far beyond normal expectancy.

Not only blow-off valves, but *all* YARWAY equipment undergoes rigorous tests before leaving the YARWAY plant. Why? For one reason—to assure longer and better service in *your* plant. Over 15,000 boiler plants are using YARWAY Blow-Off Valves—some for twenty-thirty years, or longer.

Whenever you are in need of boiler blow-off valves, be sure to make *Yarway* your way.

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# **YARWAY**

## **steam plant equipment**

BLOW-OFF VALVES  
WATER COLUMNS AND GAGES  
REMOTE LIQUID LEVEL INDICATORS  
EXPANSION JOINTS

DIGESTER VALVES  
STEAM TRAPS  
STRAINERS  
SPRAY NOZZLES

same as for full cooling and the sensible load somewhat less, lowering the ratio of sensible to total heat and therefore the quantity and temperature of air which must be handled for proper load balance. This in turn allows us to reduce the quantity and temperature of circulating water to the units.

Central plant tonnage is, of course, less than for full cooling; but air unit and water line size is even smaller in proportion. For several loads studied, in fact, air handling units and water lines sized for heating had sufficient capacity for reducing indoor tem-

peratures 8 degrees. The next larger size air unit and water line had sufficient capacity for reducing indoor temperature 12 to 14 degrees. We can therefore obtain this degree of cooling in our plant for roughly the cost of the central chiller and accessories, plus minor changes in air unit construction such as drain pans, drains, and insulation.

Indoor loads can often be reduced by strategic location of exhaust hoods and routing of air circulation. Temperatures at specific operating positions can also be lowered by introducing the cooled air at these points. In-

genuity in air circulation is just as important with partial cooling as it is for full cooling, if not more so.

Partial cooling is not suggested where full cooling is economically feasible, nor in public areas where competition utilizes full cooling. It will not result in optimum comfort conditions, but will certainly improve comfort to the extent that cooling is provided. Too often, full cooling and no cooling have been considered the only possible alternatives in new plant design. But in many instances partial cooling, or "air tempering" also deserves consideration.

## Power From Lignite

(Starts page 60)

turbine generator is served by a 70,000 sq ft condenser, designed for duty of 620,000,000 Btu per hour.

### Electrical Equipment

Generator busbar is of extruded aluminum square bar, covered by a circular aluminum housing. It is connected to eight-inch exposed aluminum bus, which continues to the 13.8 kv switchyard at the plant.

This switchyard consists of a double bus system, with each main bus a 12" x 12" aluminum extrusion capable of carrying 12,000 amperes. Both parts of the double system are fed by each of the generating units. There are five potline feeders, fed directly from either of the switchyard buses, to the Rockdale smelting plant. In addition, there are auxiliary feeders from each of the two sections of the bus system.

There are two banks of main power transformers and regulating transformers, located between the 13.8 kv switchyard and a 138 kv switchyard. Three 138,000-volt transmission line feeders are fed from the main bus of the 138 kv switchyard. These lines connect up with the Texas Power & Light Company system. Thus, the Sandow Power Plant can feed power into the Texas Power & Light Company lines; in turn, additional power as might be needed by the Alcoa Rockdale Works can be fed in from the TP & L system.

## Agreements for Atomic Power Studies

(Starts page 70)

plants. Bendix Aviation Corporation has a nuclear engineering division and has made five earlier reports to the AEC covering small reactor power plants and the commercial utilization of radioactive isotopes. The corporation is also a member of the Dow-Detroit Edison study team.

American Machine & Foundry Company has had considerable ex-

perience in the development and manufacture of control mechanisms for reactors and is a major subcontractor on the Savannah River works project. The study undertaken by American Machine & Foundry includes equipment and machinery required for atomic power plants as well as low-power reactors for special purposes and for industrial research.

## Electric Motor Drives in Baltimore Plants

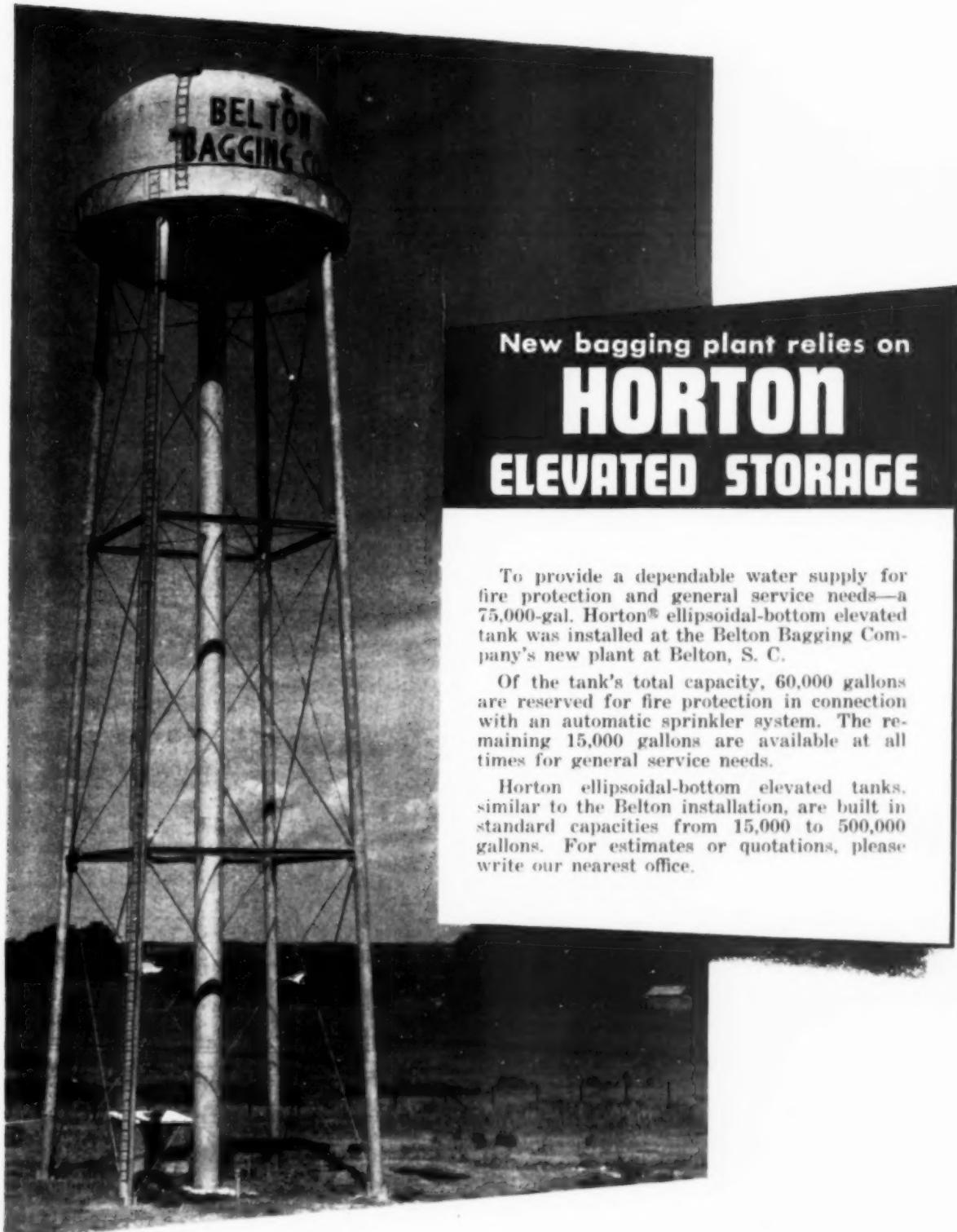
(Starts page 56)

part of the power installation was converted from d-c to a-c. Prior to the conversion, all power except for x-ray, operating rooms and some miscellaneous equipment was supplied by the hospital's own steam engine generating plant.

Plant operating tests, conducted by industrial power engineers of the Consolidated Gas Electric Light and Power Company of Baltimore, Maryland, showed that substantial economies (particularly through greatly reduced maintenance costs) could be effected by changing to purchased power. Changeover permits utilization of up-to-date hospital equipment, nearly all of which is designed for a-c operation.



ANALYSIS of power plant operation at St. Agnes' Hospital revealed the economies obtained by changing to a-c equipment and purchased power.



New bagging plant relies on  
**HORTON**  
**ELEVATED STORAGE**

To provide a dependable water supply for fire protection and general service needs—a 75,000-gal. Horton® ellipsoidal-bottom elevated tank was installed at the Belton Bagging Company's new plant at Belton, S. C.

Of the tank's total capacity, 60,000 gallons are reserved for fire protection in connection with an automatic sprinkler system. The remaining 15,000 gallons are available at all times for general service needs.

Horton ellipsoidal-bottom elevated tanks, similar to the Belton installation, are built in standard capacities from 15,000 to 500,000 gallons. For estimates or quotations, please write our nearest office.

## CHICAGO BRIDGE & IRON COMPANY

Atlanta 3..... 2180 Healey Bldg.  
Birmingham 1..... 1531 North Fifth St.  
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Chicago 4..... 2107 McCormick Bldg.  
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Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

Detroit 26..... 1534 Lafayette Bldg.  
Houston 2..... 2132 C & I Life Bldg.  
Los Angeles 17..... 1545 General Petroleum Bldg.  
New York 6..... 3312—165 Broadway Bldg.  
Philadelphia 3..... 1646—1700 Walnut St. Bldg.

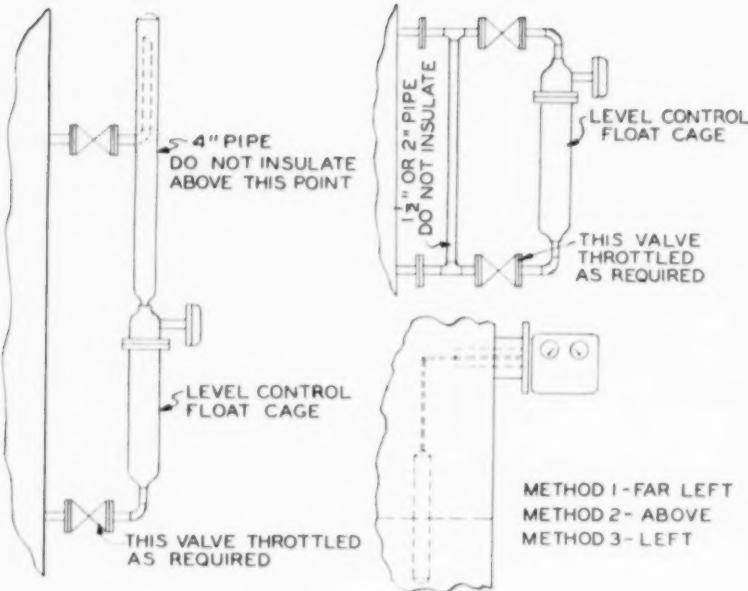
Pittsburgh 19..... 3252 Alcoa Bldg.  
Salt Lake City 4..... 545 W. 17th South St.  
San Francisco 4..... 1531—200 Bush St.  
Seattle 1..... 1745 Henry Bldg.  
Tulsa 3..... 1628 Hunt Bldg.

In Canada—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.



## HELPING the MAN-IN-THE-PLANT

# Ideas.. Methods.. Gadgets



### Improving Liquid Level Control Operation

BY G. D. McCLELLAND  
TUSCALOOSA, ALABAMA

IN distillation towers, sidestream strippers, and other vessels into which steam is introduced as a stripping medium or for other reasons, difficulty is often experienced with a violent movement or bouncing of the float in externally mounted liquid level controls.

The usual cause of this trouble is condensed steam or volatile hydrocarbons dropping into the hot liquid in the float cage producing violent agitation or, in some cases, minor explosions. This action is often severe enough to damage the float or torque tube and thus render the control inoperative.

In a Southern refinery this problem has been solved by use of the three different methods illustrated. In **Method 1** the steam or hydrocarbons condense and flow back into the tower rather than drop into the bottom of the float cage. The valve on the bottom connection is throttled as necessary to dampen any surging of the liquid which occurs in the tower. The installation shown in **Method 2** utilizes the same principle as that shown in **Method 1**, but the condensing section is arranged differently in the manner shown. The installation shown in **Method 3** is simply an internally-mounted liquid level control which solves the problem by eliminating its source; that is, the condensation of steam or hydrocarbons. This method is the simplest and most direct solution, but its application is somewhat limited because of

the difficulty in maintaining an internal float.

Another solution to this problem which can often be used is to mount the external float cage as close as possible to the vessel and then carefully insulate the float cage and the connecting piping. This method when properly done eliminates the possibility of condensation.

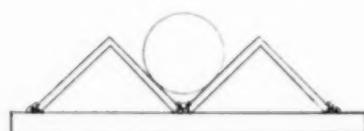
### \$\$\$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

### Drilling Rounds

A V-BLOCK is a common item for use in handling and drilling round stock. Ordinarily one is either bought or milled from steel stock or welded up of angle iron.



To weld on a V from a standard angle requires careful leveling. But the job can be simplified by laying two angles flat down on the base as indicated in the sketch.

By L. H. Houck, Mo.

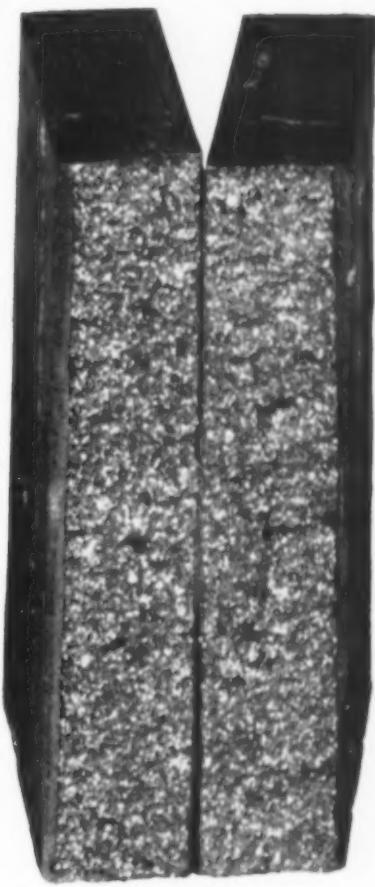
# HERE IS THE DIFFERENCE



## WROUGHT IRON

These are actual photographs of fractured pieces of wrought iron and steel. The picture at the left shows the fibrous structure of wrought iron. How this differs from the crystalline structure of steel is readily apparent. It is the presence of many thousands of tiny threads of glass-like iron silicate that gives wrought iron this unique fibrous structure and it is this structural feature, duplicated in no other metal, that gives wrought iron its superior resistance to corrosion and fatigue stresses.

While the initial cost may be higher, actual service



## STEEL

records in numerous applications prove that wrought iron is the most economical buy because it lasts longer. Ask any Byers Field Service Engineer to show you fractured pieces, similar to those illustrated above. Write for our booklet, "The ABC's of Wrought Iron."

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Department: New York, N.Y.

# BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON  
**WROUGHT IRON**  
TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY STEEL PRODUCTS

## Ideas . . Methods . . Gadgets (continued)

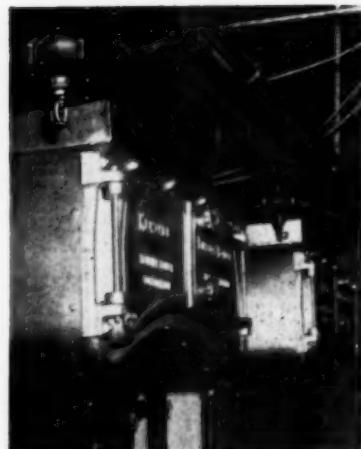
### Safety Shut-Off Valve For Boiler Gas Lines

AT THE King Powder Company in Ashland, Kentucky, controls on the boiler water supply failed and deprived the boilers of water. Because the controls failed, the fuel supply was not cut off. The pressure pop-off valve opened and relieved the steam pressure. The fuel flow continued and the tubes were seriously damaged. Damage to the boiler and resultant factory shutdown was a considerable economic loss to the company.

When the boilers were repaired, King Powder Company engineers

decided to install Valco automatic, temperature actuated safety shut-off valves in the gas lines supplying the boilers. These valves are quick closing, normally held in the open position by an actuating head that operates like a standard sprinkler head. At specified temperature, the head opens and releases the tension on a spring, which snaps the valve closed in a fraction of a second.

Any future unusual temperature rise, such as steam escaping from the open pop-off valves, or a fire in the boiler room, will cause the safety valves to function, automatically shutting off the supply of fuel.



SHUT-OFF VALVES installed in the gas lines supplying boilers at the King Powder Company, Ashland, Kentucky. The Valco valves (Valco, Inc.) are packless—using a bellows seal to prevent binding and leakage. This type of seal permits rapid inspection and the change of heads without leakage.

### Hydraulic Press Made from Surplus Parts

BY R. J. WORCESTER, Assistant Manager

Morton Salt Company, Grand Saline, Texas, Plant

SEVERAL months ago we built an electric hydraulic press from government surplus aircraft hydraulic equipment. We use the press principally for cutting keyways but also find it applicable for other light pressing jobs.

By using the press and a keyway broach we can cut keyways up to  $\frac{5}{8}$ " wide in most metals in 5 to 10 minutes. We are able to cut precision keyways in much smaller

bore than we were formerly able to handle.

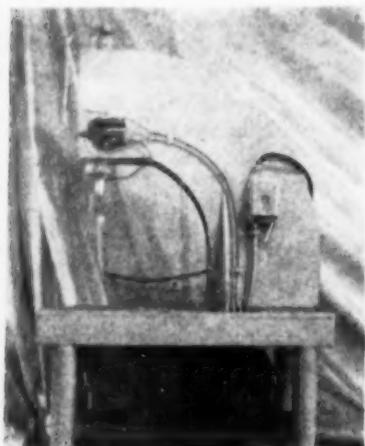
The press table and supports for the hydraulic cylinder are made from 1" to  $\frac{5}{8}$ " boiler plate respectively. Table legs are made of 4" pipe. Boiler is a 2 hp, 875 rpm, but of course higher speed motors can be used if a faster ram travel is desired.

In any shop where machinists and welders are available such a press could be constructed for \$250 or less. This does not include the cost of a motor, which most plants have available. The relief valve was also shop made from a block of brass approximately 2" cube.

The following specifications cover the hydraulic equipment:

**Cylinder**—4" bore,  $1\frac{1}{2}$ " rod, 18" stroke; 3000 psi maximum working pressure; cost \$29.95. Speed of ram using pump listed below and 875 rpm motor is 35.4"/min.

**Pump**—Vickers P-4 angle pump, 507 cu in. displacement per rev, 6 gpm at 3000 rpm; maximum working pressure 1500 psi; maximum rpm 3750; cost \$22.50.



LEFT—4-way valve and piping conveniently mounted for right hand operation.

TOP RIGHT—Pump and motor base and method of mounting pump. Oil reservoir can be seen behind the pump.

LOWER RIGHT—Relief Valve mounted on same base with pump and between pump and reservoir.

**Valve**—V-17 four-way poppet type valve with built-in relief valves. Cost \$9.75.

We have set the relief valve on our main pump line so that the motor is loaded almost to stalling. This develops approximately 10 tons pressure on the ram. The speed of the ram travel can be controlled by the movement of the 4-way valve.

### \$\$\$ For Your Ideas

(Details on next page)

### **\$\$\$ For Your Ideas**

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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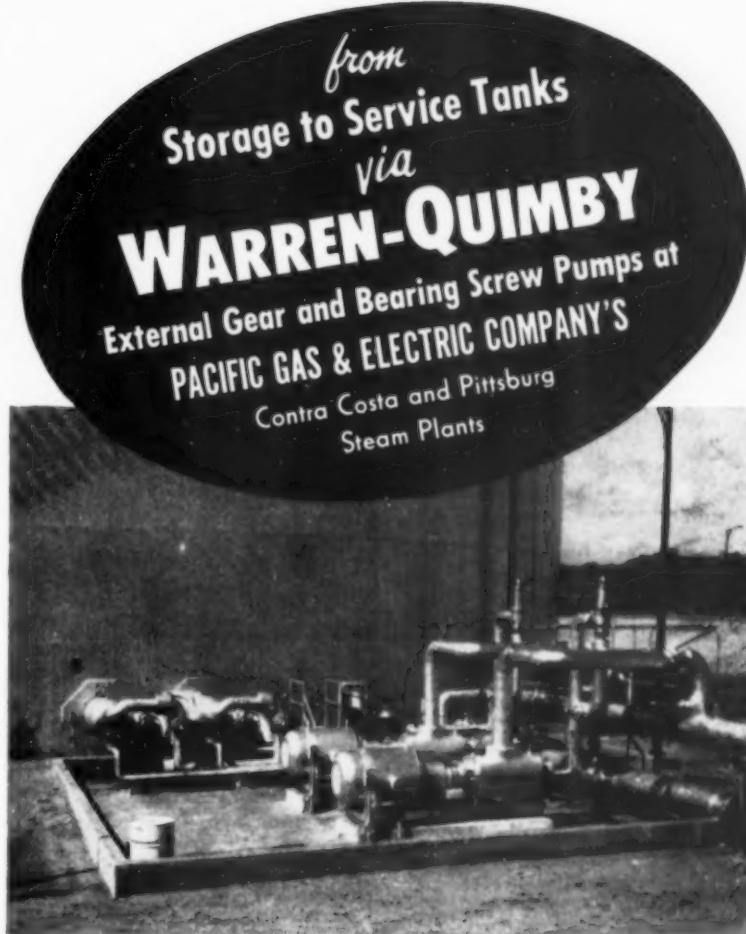
### **Saw Filing Clamp**

**I**N Linn, Missouri, Jule Neikamp fastened a board on an old clamp out of the junk box, and fitted it with bolt and wing nut, to hold circular saws for resharpening. Clamping the outfit on a bench or handy ledge brings the work to comfortable height, and the wing nut on the center bolt makes it easy to clamp the saw in different positions as the teeth are filed.

*By L. H. Houck, Mo.*



from  
Storage to Service Tanks  
via  
**WARREN-QUIMBY**  
External Gear and Bearing Screw Pumps at  
**PACIFIC GAS & ELECTRIC COMPANY'S**  
Contra Costa and Pittsburg  
Steam Plants



Warren Quimby No. 9 External Gear and Bearing Screw Pumps.  
*Photo, courtesy of Pacific Gas & Electric Company*

**F**UEL Oil Transfer is one of the many important jobs Warren-Quimby Screw Pumps do exceptionally well. In this case the External Gear and Bearing type was selected because of the corrosive action of the sulphur content of the oil to be handled. All bearings and driving gears are external to the body and separately lubricated in a bath of oil.

Warren-Quimby External Gear and Bearing Screw Pumps are designed for handling a great variety of non-lubricating liquids, including water, brines, distillates, sulphuric acids, sludges, molasses, acetates, as well as petroleum and other products which may contain abrasive or corrosive elements.

This design is built in any machinable metal or alloy in addition to regular steels and cast iron. Also, jackets for either heating or cooling can be furnished.



**WARREN PUMPS**  
WARREN STEAM PUMP COMPANY, INC.  
Warren, Massachusetts

## Preventing Diesel Break-Downs

By L. W. FITZPATRICK,

Chief Engineer, Department of Corrections,  
Jefferson City, Missouri

**C**ONSIDERABLE accidental damage has been prevented by automatic electric switches designed to signal diesel operators when improper conditions develop during normal operation. These are usually pressure and temperature controlled switches wired to visible and audible alarms. They are installed principally to respond to low oil pressure and high oil temperature.

Determining whether to have these units function merely as alarms, or as direct operating controls to automatically stop an engine requires considerable study. With a single engine in operation, stopping does not cause the complications that would result from stopping one or two paralleled units where the entire load would shift to the remaining unit in operation and ultimately overheat it and drop it from service.

Methods of stopping diesel engines are numerous and some have serious disadvantages. Obviously, **stopping fuel supply** to injection pumps is easily accomplished through a solenoid valve in the fuel supply line. The engine, however, will continue to fire on the remaining fuel between the stop valve and injection valves.

When the injection valves run low on fuel, air will likely be sucked into the line, preventing proper fuel ignition in the cylinders when the engine is restarted.

**Stopping injection pump action** is most commonly used due to its quick action and elimination of air binding in the pumps. Electrical release of a spring overcomes engine governor springs and moves the fuel pump governor into shut-off position.

**Holding an exhaust valve open** will stop diesel operation because cylinders require compression for fuel ignition. This immediately stops compression and firing ceases. Additional advantage of

this method is the ability to stop an engine if excessive fuel is being passed because of a defective fuel pump or governor. It is also valuable in the case of a two-cycle engine that is overspeeding due to lubricating oil drawn from the crankcase following through air inlet ports and being burned in the cylinders.

### Maintenance Checks

Comparing the performance of two identical units in different plants is much like comparing operation of one automobile model with another. Neither operates under identical maintenance conditions. An engine that is regularly checked with a cylinder pressure indicator and pressures kept within a few pounds of each other will operate better than one not so well maintained.

Regardless of engine condition it still must develop 1.34 hp to produce 1 kw. In pulling full-rated load, a 10 to 30% fuel increase may be necessary because of lowered physical condition. And fuel injection timing is automatically advanced when the extra fuel is added.

Leaky piston rings with increased blowby require still more fuel, and with the rack-rotating fuel pump increasing fuel volume, fuel-injection timing is again advanced.

And, if water-jacket temperature is too low, combustion is delayed as fuel burns improperly, and more fuel is again necessary—increasing injection timing.

With fuel nozzles and pumps in poor condition, poor atomization results in incomplete combustion. This means more fuel—and finally fuel-injection timing is advanced beyond the designed limit, increasing the possibility of bearing troubles, crankshaft scoring, and cracked or deflected cylinder heads.

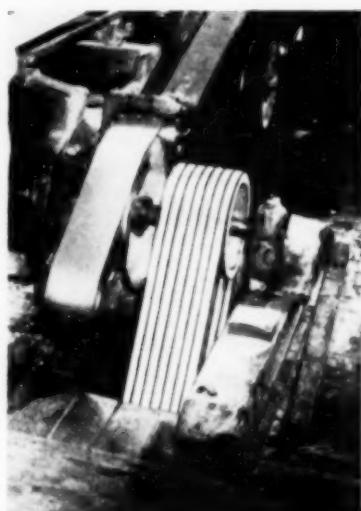
Modern diesel engines have an enviable safety record on a par with turbines, as any plant operator can attest. But, this safety record is possible only with constant maintenance and pressure checks as in any prime mover operation, steam or water.

## New Drive Saves \$500 Per Year

**N**ATIVE lumber is run through a double surface planer in the Hutton and Bourbons Company mill at Hickory, North Carolina.

Power for the surface planer was supplied by an engine with a flat belt drive to the planer. Whenever a particularly heavy or rough board put a load on the drive, the flat belt would start slipping. And planning was brought to a standstill until the flat belt caught hold and started the planer again.

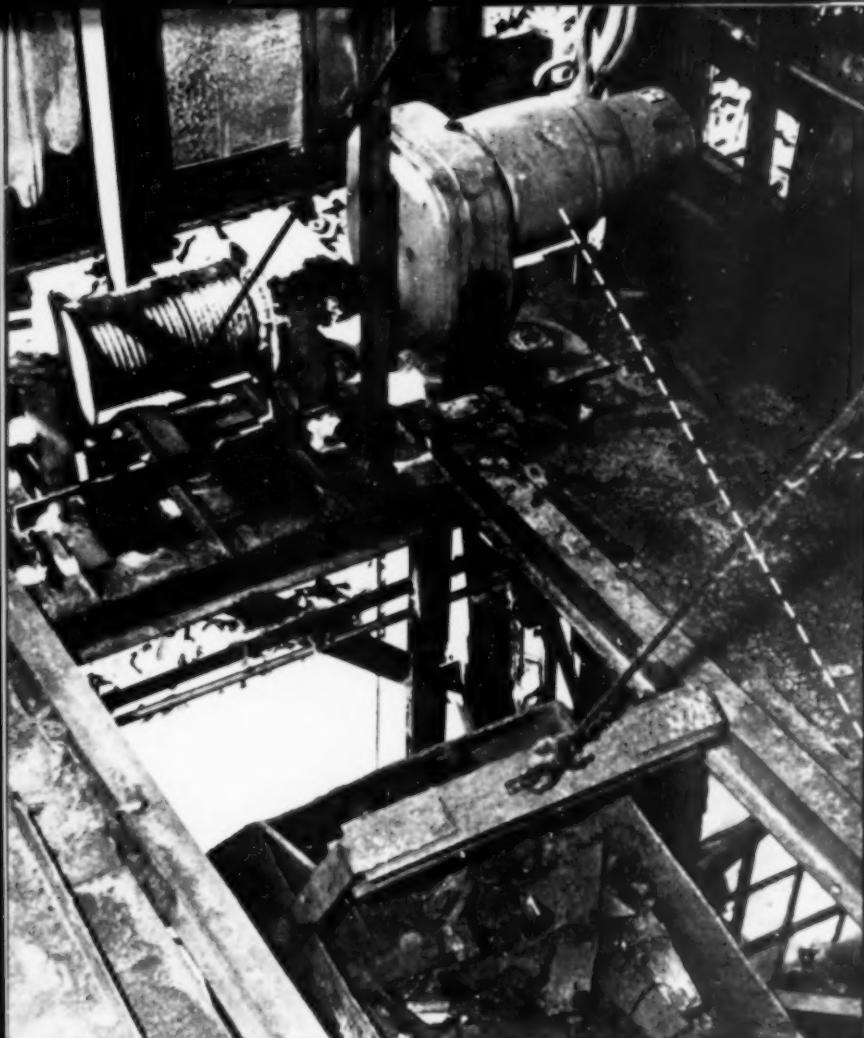
The superintendent, Mr. Frank Hollar, said that the tension necessary to keep the flat belts from slipping made the belts go to pieces so fast that belt replacements alone were costing about \$500 a year.



Mr. Hollar had the Gates representative in the area design a new drive to replace the old flat belt.

Those original Gates belts have been in use over seven years, and Mr. Hollar says that the belts have required no maintenance. He estimates they have saved the company over \$500 each year.

By Robert J. Troutman, Hickory, N. C.



## STANDARD BRAKE SHOE CHOOSES SLO-SPEEDS FOR RUGGED SERVICE

The power drive on our cupola charger has to take a lot of punishment, reports Mr. J. R. Karlovic, Plant Supt. for Standard Brake Shoe and Foundry Co., Memphis... and Slo-Speed with motor mounted brake gives us the dependable, trouble-free service we must have for day-in, day-out operation, carrying a load of 2500 lbs. and making 25 round trips per hour to keep our cupola charged with metal, coke and limestone.



## INDUSTRY NAMES SLO-SPEED PRODUCTION ADVANTAGES

### In a nation-wide user survey of Sterling Slo-Speed Geared Electric Power Drives:

**86%** Lowered Maintenance Costs. **56%** Increased Plant Safety. **76%** Reduced Lubrication Requirements. **56%** Obtained Better Protection Against Outdoor Exposure. **46%** Required Less Installation Space. **40%** Achieved Greater Cleanliness. **10%** Reduced Power Costs. **22%** Increased Production. **56%** Simplified Installations. **32%** Improved Employee Morale.

**12%** Achieved Quieter Operation. **38%** Modernized Equipment and Machines for Better Performance, Better Appearance.

Investigate the possibilities of bringing some of these Slo-Speed production advantages to your plant. Sterling Engineering Sales Offices and over 400 Distributors and Service Shops throughout the nation effectively serve every industrial, commercial and agricultural area.



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**STERLING** ELECTRIC MOTORS

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## Ideas . . Methods . . Gadgets (continued)

### Portable Tumbler Cuts Plating Time

**S**MALL aluminum parts are Alodine-plated inside a power driven tumbler at Temco Aircraft Corporation. Recently introduced at the Dallas, Tex., factory, the portable tumbler has shaved eight man-hours per shift off time required for plating.

#### Former Method

Small parts formerly were arranged in wire baskets for their two-to-three minute dip in the corrosion resistant solution. Parts were carefully spaced so that no two would become moisture sealed and all surfaces would get full exposure to the Alodine bath. This painstaking job was a full time task for at least one man per shift.

#### Tumbler Design

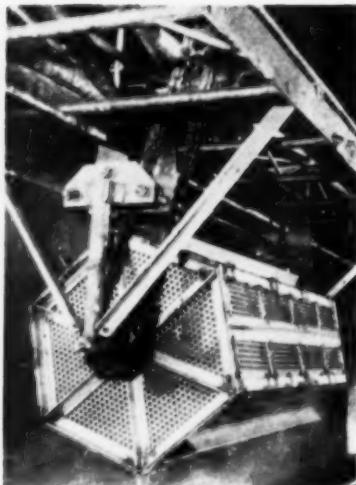
Paul W. Green, foreman in aluminum processing, devised the tumbler improvement. By keeping parts and solution in motion, it insures thorough bathing of all surfaces. The squirrel cage speeds plating, and it further removed workers from possible contact with irritating Alodine solution.

Tumbler shape is hexagonal and its walls are made of 16 gauge stainless steel, perforated throughout with  $\frac{1}{2}$  in. diameter holes in staggered pattern. Length is 4 ft,  $3\frac{1}{2}$  in. Width is 2 ft, 2 in., and each of the tumbler's six flat sides is 1 ft, 3 in. in width.

Inside the tumbler, three perforated partitions are secured by stainless steel angles. Partitions permit segregation of four different varieties of parts, or they can be removed to admit parts up to 4 ft in length.

A stainless steel flange runs from end to end on each outside face of the hexagon. These fins act as stiffeners and as agitators to keep the plating solution in motion.

The tumbler revolves on two  $\frac{3}{4}$  in. diameter pivot rods, one of which is inserted in a 14-tooth sprocket.



**TUMBLER** never is revolved when it isn't submerged, even though this might simplify drying. Serious scratching of Alodine plating results if parts are revolved outside the tank. Temco Aircraft in Dallas is now constructing an unloading cart with dimensions and partitions to match those of the tumbler. It will roll under the tumbler and partition dumped parts into the same lots they were assigned when placed in the tumbler.

Sprocket and tumbler are revolved by a 1.506-pitch metal roller chain, driven by a  $\frac{1}{2}$  hp Boston ratio motor to which a 7-tooth sprocket is attached. Motor mount consists of three cast iron bars, each 6 ft long. The tumbler is suspended from the motor mount, and the mount itself is attached to an overhead crane rack.

#### Tumbler Operation

From the time parts are loaded into the tumbler and the tumbler door is closed with hinge pins, the plating operation is entirely push-button.

Conventional crane control buttons are used to move the tumbler over the 40 ft Alodine tank and lower it into the solution. The operator controls the crane from his position at the head of the tank.

To put the tumbler in motion, he reaches behind him to an on-off switch, mounted on a post, which actuates the tumbler motor.

After the required immersion time has elapsed, tumbler action is stopped. Then crane and tumbler are moved clear of the tank, and parts are unloaded for drying.

### Marking System for Electrical Equipment

**I**NDUSTRIAL operations are becoming a maze of conduit and controls to motors in all parts of the plant. To speed up the electrician's work and his safe operation of plant equipment, a marking system is needed that can be followed both by supervisory personnel and new men on the maintenance crew.

We have employed a code system for motors and controls in our kraft paper mill that not only saves the electrician time but promotes safety in routine troubleshooting.

#### System Employed

The coding system starts from a main feeder into a substation. This station may be the beginning of a plant process and can start with the letter (A); with other stations running down through the alphabet and into double letters if necessary. The (A) station is marked on the door. The 2200 volt bus, low voltage bus and all motors and starters out of this station will carry this (A). The 2200 volt starters carry the letter and one number such as (A-1) while the low voltage motors will have the number (A-1-1). This lettering goes on the motor, starter and any other electrical parts in the motor control.

The system tells the electrician what voltage is on the motor. As a machine goes out, perhaps from overload, he or anyone else knows exactly what station and what starter to check and reset. If a machine stops, the operator can tell central control the motor number. Many steps and a considerable amount of time are saved in getting into operation again.

Such a system eliminates the "memory" that so many electrical departments depend on to operate their plants.

By *T. D. Somerville,  
Chief Electrician*

### \$\$\$ For Your Ideas

(Details on next page)

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## **Stud Removal Method**

A WELDING company in Maryland is saving more than \$6,000 each year in removing studs from railroad diesel cylinder liners. By using a Size 34U Ingersoll-Rand electric Impactool for stud removal, time and labor costs have been reduced a full 75%. The firm specializes in maintenance and modification work on big railroad diesels.



An average of 50 liners are processed a week, and the stud removal, first step in a series of operations, now requires the services of one man using an Impactool for  $2\frac{1}{2}$  days per week. This work formerly required the services of two men for five days each week. The job formerly took 80 man-hours; now, with the Impactool, it takes 20 man-hours. At an average wage rate of \$2.00 per hour, this saving of 60 hours a week amounts to more than \$6,000 a year.



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But as with fine pastry, dough alone doesn't finish the job! So Plibrico engineers work with you from the grassroots level, blueprinting plans best suited to your problems. Finally, expert crews complete construction efficiently and economically. For superior service, call for *Plibrico* . . . where you know you're getting your money's worth!

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# Equipment..Supplies..Methods

FOR FREE INFORMATION — Circle code number on pages 16 & 17

## Labeling Tape Sticks to Oily Metal Surfaces

**G-1** LABELON TAPE COMPANY, INC., 450 Atlantic Ave., Rochester 9, N. Y., has developed a new pressure-sensitive labeling tape which adheres to oily as well as to dry metal surfaces.

Feature of the new tape, known as Oil-Stik, is a special adhesive that combines with oil to produce a firm bond, yet permits the tape to be stripped off any time without leaving a

mark. The bond becomes progressively stronger for the first 50 or 60 minutes, because of the continuing action of the oil on the adhesive.

Developed principally for identifying, warning, and for every other labeling use, the new tape can be used with pre-printed data alone or in combination with hand-written information.

Labelon Oil-Stik tape used to protect critical bearing surface still wet with cutting oil. Tape has excellent writing surface or can be pre-printed.



## Adapter Connects Aluminum Cable to Electrical Eqpt.

**G-2** THE THOMAS & BETTS COMPANY, Elizabeth, N. J., has introduced an aluminum cable adapter which makes possible the interchangeable use of aluminum and copper electrical conductor in switch and control equipment.

The adapter is made in straight and right angle types for No. 4 and No. 2 stranded aluminum cable. Made from a special tin-plated copper alloy, the adapter is designed to combine good electrical conductivity with springi-

ness. It has a round barrel from which extends a smaller, split cylinder called a tang. The barrel fits on the cable and the tang is inserted under the equipment clamp. The slot that splits the tang extends well into the barrel forming two legs.

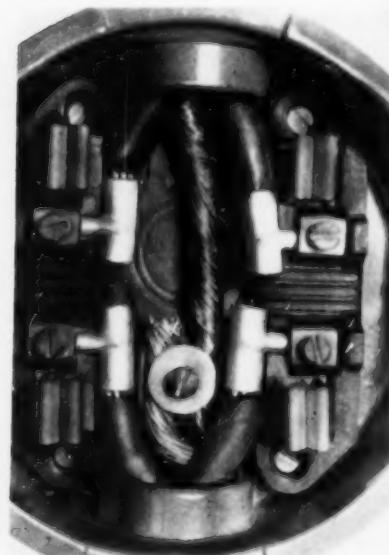
When clamped, the adapter's legs are squeezed together like cantilever springs. This spring pressure is effective all around the aluminum cable surface and compensates for any expansion and contraction due to current overloads.

The adapter's copper-alloy construction protects the ductile alumi-

num cable from mechanical damage by electrical equipment clamps, while its heavy coat of tin plate resists galvanic corrosion.

The adapter is installed simply by driving it on the cable with a common tool such as a pliers or hammer. Then, the adapter-cable assembly is inserted under the equipment clamp. As the clamping screw squeezes the adapter's legs together the serrated bore takes a firmer grip on the cable.

The company recommends the adapter for meter enclosures, other enclosed electrical terminal connections and for connecting cable to exposed pole-line equipment, such as transformers, cutouts, capacitors, etc.



**LEFT**—Thomas & Betts right-angle type cable adapters used in a meter pan enclosure. In addition to providing efficient electrical and mechanical joints, the adapters are compact; save space in the enclosure. It is unnecessary to bend bare cables at right angles to connect them to clamps.

**TOP RIGHT**—Right-angle type adapter has just been removed from an aluminum cable by spreading the adapter's legs. Cable end was dipped in black paint before its insertion in adapter to demonstrate how the adapter barrel's serrations break through the oxide film that covers the cable. Note that adapter has scraped much of the paint from the cable's surface.

**BOTTOM RIGHT**—Serration marks show clearly on strands of aluminum conductor after removal of adapter. Serrations are made by sharp ridges (seen inside the adapter barrel).

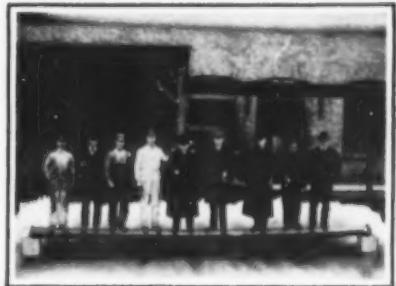


The first product of Taylor Forge is still first in the light-wall pipe field. Its spiral welded seam makes it stronger in every way than any other pipe of its weight.

Sizes, 6" through 36". Thicknesses 14 gage through  $\frac{1}{4}$ ". All types of end joints, fittings and fabricated assemblies. See your Taylor Forge Distributor for up-to-the-minute facts.

**TAYLOR FORGE**

TAYLOR FORGE & PIPE WORKS • General Offices and Works:  
P.O. Box 485, Chicago 90, Illinois • Offices in all principal cities  
Plants at: Carnegie, Pa.; Fontana, Calif.; Gary, Ind.; Hamilton, Ontario, Canada



Taken in 1905 ...

This faded photo was snapped five years after Taylor Forge started back in 1900. That line-up of old timers were putting on a convincing demonstration of the first Taylor Forge product—"Taylor's Spiral Riveted Pipe."

The clothing and hat styles may be dated, but not the pipe. Taylor Spiral Pipe (now welded instead of riveted) then was, and still is, the strongest pipe of its weight.

But while the pipe itself proved revolutionary, the only flanges then available for it—cast iron flanges—were not up to the standard of the pipe. The iron flanges often cracked and caused trouble...and since Taylor Forge couldn't get better flanges, Taylor Forge decided to make better flanges.

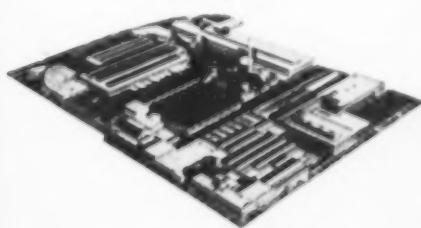
So in that long-ago Taylor Forge set up facilities for making forged steel flanges. It was a pioneering step...the first time forged steel flanges had been made on a commercial scale. It was also a turning point...for it marked the transition from simply making pipe into the field of *designed piping*.

An episode in the story of Taylor Forge leadership in designed piping



We started here in 1900.

One of the five Taylor Forge plants of today is shown below.



## **new equipment (continued)**

For more data circle item code number  
on the postage free post card—p. 17

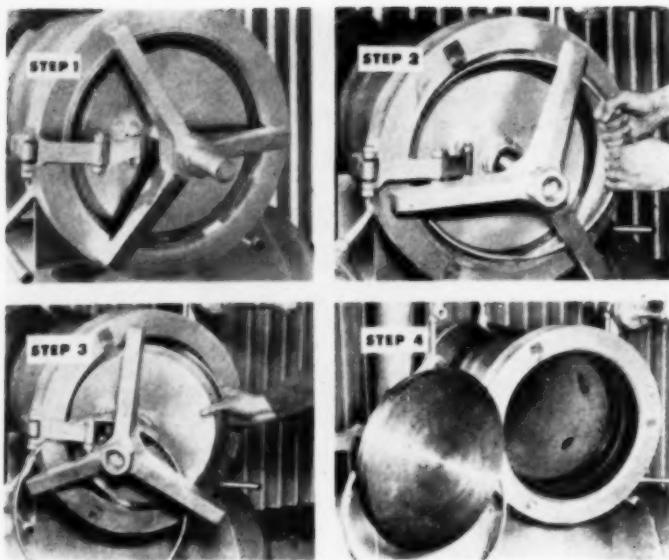
### **Closures for Pressure Vessels and Piping**

**G-3** SILLERS ENGINEERING COMPANY, Box 7193, Dallas, Texas, has introduced an entirely new type pressure closure for all types of pressure vessels and piping systems.

The Flex Ring Closure, as it has been designated by the manufacturer, incorporates an internal pressure closing, metal-to-metal seal principle. It seals tighter as the pressure upon it increases.

Advantages over old-style flange closures are: less time in opening and closing (only one bolt to operate); less weight; fewer parts; tighter seal, more safety, space saving, and lower initial cost through material savings.

The closures consist of four main parts—weld neck, plug, gasket and spider. The unique feature of the closure is the patented flexible metal gasket which is held in compression between the plug and weld neck. The



Simple disassembly steps of Sillers Flex Ring Closure illustrated with 16"-600# series (hinged). STEP 1—Unit assembled as in service; STEP 2—Spider released, gasket being removed; STEP 3—After gasket is removed, plug is rotated to open; and STEP 4—Flex Ring Closure unit completely opened.

gasket is flexed to an elliptical shape to allow it to pass through the plug opening. Once in place, tightening

the spider nut causes the gasket to return to a round shape for proper seating position.

### **Valve Shuts Off After Equipment Safely Cooled**

**G-4** VAN VOOREN PRODUCTS, East Moline, Ill., is manufacturing the Water Mizer, which consists primarily of a solenoid operated water valve and a thermostatic shut-off.

The device is designed to help the operator of water-cooled machines (welding equipment, hydraulic systems, air compressors, etc.), carry out his two important responsibilities: first, to turn the water on when the equipment goes into use; and sec-

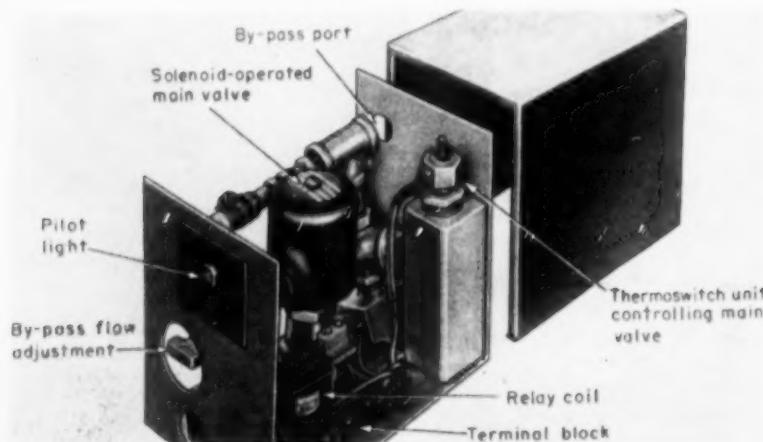
ond, to shut off water flow at the end of the operating cycle, but not before the machine has cooled to a safe temperature.

When the valve is used with welding equipment, an air solenoid valve coil or clutch solenoid on the welder opens the valve in the Water Mizer through a relay. With other equipment, the valve may be wired to the contactor coil. As long as the operation continues, the solenoid holds the valve open, providing a full flow of water to the equipment. A return line from the equipment carries the water back to the Water Mizer where

the flow is monitored by a Thermoswitch unit before going to drain. A pilot light indicates when the water is flowing through the valve.

The precision thermostat, manufactured by Fenwal Inc., is normally open and is wired in series with the water valve solenoid. As soon as the water temperature in the return line exceeds 100 F, the thermostat contacts close to form an alternate circuit to the valve solenoid. When the weld is completed, the valve solenoid, controlled by the welding machine, is de-energized. However, because of the parallel circuit through the thermostat, the valve is held open as long as the temperature in the return line exceeds 100 F. This feature is not a time delay, but a thermal delay.

When the return water drops below 100 F, indicating a safe equipment condition, the thermostat contacts open, de-energize the solenoid, and cut off the water flow.



Major elements of the Water Mizer unit that regulates the water supply to cooled equipment on the basis of actual need. Solenoid-operated valve supplies full water flow as soon as the equipment is started. Flow continues after equipment shuts down until Fenwal thermostat in return line senses a safe temperature.

#### **Low-Draft Cut-Off Switch**

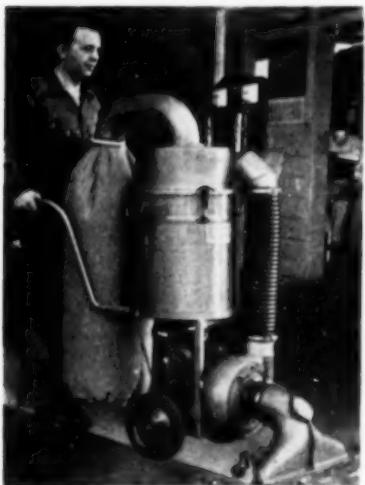
**G-5** CLEVELAND FUEL EQUIPMENT COMPANY, 7316 Associate Ave., Cleveland 9, Ohio, has developed a new device which protects boilers in the event of mechanical or natural draft failure, and prevents shut-downs caused by momentary puffs.

The control replaces conventional make-or-break switches and is suitable for all firing methods and boiler types. It also activates remote alarm systems or signal lights, and its cut-off point can be adjusted on the job over a wide range.

A signal light or alarm indicates momentary low draft burner puffs, as well as sustained low draft conditions. But a time delay device, self-compensating for ambient temperature, prevents unnecessary burner stoppage due to transient conditions. Positive, fail-safe protection can be had with installation either at combustion chamber or at breeching.

#### **Heavy Duty Floor Cleaner**

**G-6** HANDLING DEVICES, INC., 43 Pearl St., Brookline, Mass., is offering a new floor cleaner for industrial and power plants.



The wide orifice of this vacuum cleaner (31 1/4 in. diameter) keeps a 22 in. path free of dust as it sweeps at speeds up to 20,000 sq ft per hr. A large suction nozzle is mounted in fixed position just above the floor surface. Large pieces of scrap and litter can be collected without clogging.

This machine is available with gasoline or electric power. It features a direct driven impeller turning at the rate of 3,450 rpm and drawing in air at 860 cfm. Open stage impeller has housing clearance of 21 1/2 x 1 1/2 in.

#### **In One of the South's Largest Hot-Dip Galvanizing Tanks**



**Double-dipping accommodates pieces up to 45 feet long**

Add years of useful life to iron or steel. Give your products new sales appeal. Genuine hot dip galvanizing will do it.

Our new facilities have greatly increased our capacity and made it possible to hot dip galvanize much larger items. You get a more uniform, cleaner job; fast service.

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**FABRICATING DIVISION**

**Atlantic Steel Company**

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## **new equipment (continued)**

For more data circle item code number  
on the postage free post card—p. 17

### **Waterproof Power Plug and Receptacle**

CANNON ELECTRIC COMPANY, Box 75, Lincoln Heights Station, Los Angeles 31, Calif., is offering a new rapid disconnect power plug and receptacle for use on tractors, trucks, stationary engines, heavy industrial equipment, or any other portable or stationary prime power sources.

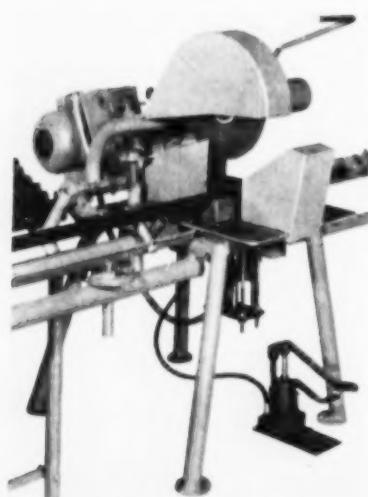


The fittings carry two 200-ampere contacts for number 0 cable with 110 v to 440 v service. The cable entry is watertight sealed with a screw tightened clamp.

Shell is steel and synthetic rubber for strength and resiliency. The steel parts are cadmium plated to resist corrosion. The spring actuated snap covers protect both plug and receptacle automatically against moisture and dirt by closing when not in use.

### **Abrasive Cut-Off Saw**

WALLACE SUPPLIES MANUFACTURING COMPANY, 1300 Diversey Parkway, Chicago 14, Ill., has announced a new, versatile and low-cost abrasive cut-off saw, which permits fast, square and prac-



tically burr-free cuts of tubular sections up to 4½ in. od or equivalent relieved shapes and solids up to 3 in. diameter.

Abrasive wheel mounted on ball bearing spindle maintains perfect alignment. Unit is powered by 7½ hp motor, with interchangeable V-belt pulleys to drive the 16 in. cutting wheel. Wheel is quickly changeable in its swinging type guard. Tubular steel frame anchors it to the floor. Optional equipment is available to meet various plant requirements.

### **Midget Cleaners for Small-Diameter Tubes**

THE AIRETOOL MFG. CO., of Springfield, Ohio, is offering a full line of midget cleaner heads and motors which are flexible and powerful enough to completely eliminate small-diameter tube maintenance difficulties.



Airetool Midget Cleaners can be used on curved tubes from 13/16" I.D. to 2½" I.D., and straight tubes from ½" I.D. to 1½" I.D.

They are designed for thoroughly cleaning light scale from heat exchanger and condenser tubes, and will quickly remove other foreign deposits from small straight or curved tubes in refinery or industrial chemical installations. The cleaners are made in a wide variety of cutter, drill, and brush heads, expanding and non-expanding, to fit every type of cleaning operation. When used in combination with universal joints or flexible shafts, they are effective in cleaning bent tubes where the radius of curvature is short.

### **Instrument Valve**

MANNING, MAXWELL & MOORE, INC., 65 Grove St., Watertown 72, Mass., has introduced a new high pressure in-



strument valve especially designed and engineered for such services as instrument panels and lines, gauge, by-pass and corrosive lines, and orifice meters.

The new 6000 psi Hancock stainless steel instrument valve is small, easy to handle, weighs only 2½ lb. Its space-saving compactness permits close alignment of piping with near structures. The packing gland can be readily pulled tight in close quarters and disassembly presents no problem. Every practical use of stainless steel assures maximum protection against corrosion. Sizes of ¼ in., ⅜ in. and ½ in. are available.

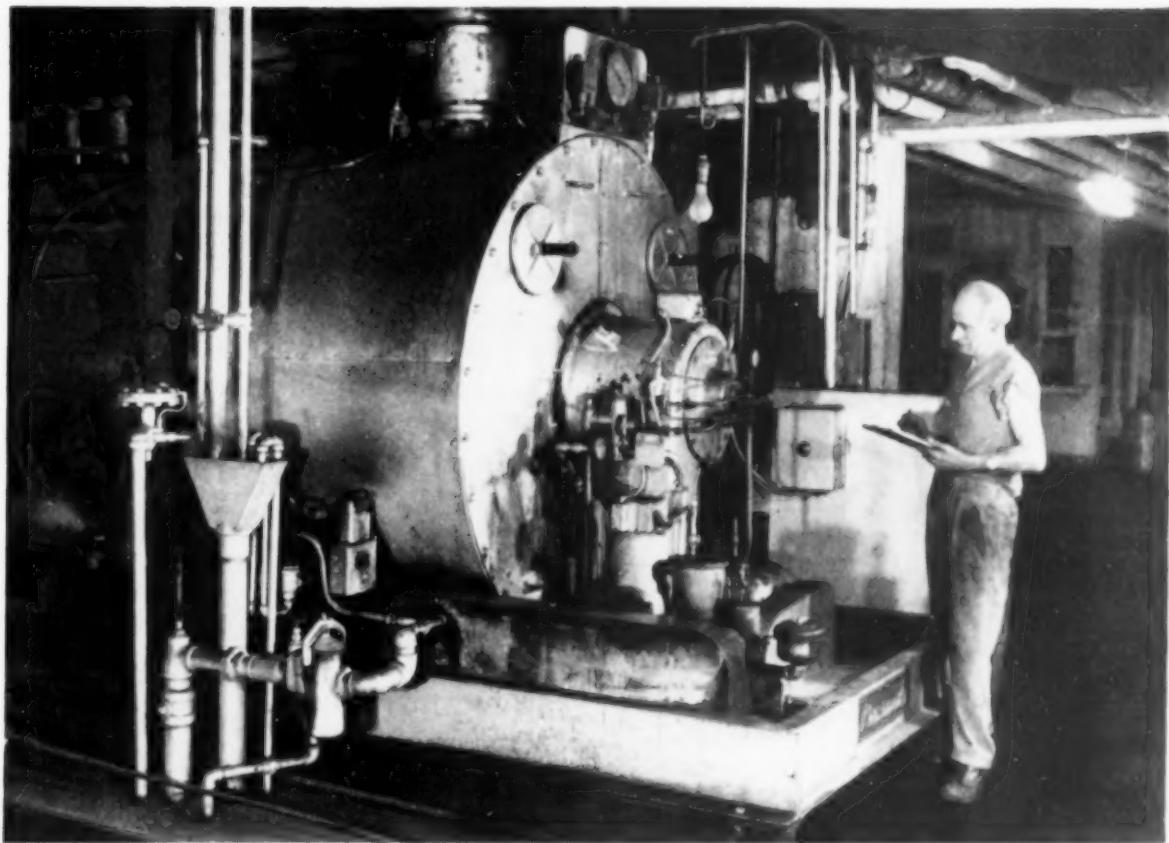
### **Diaphragm Operated Solenoid Valves**

ECLIPSE FUEL ENGINEERING COMPANY, Rockford, Illinois, is now producing a complete line of "DO" (diaphragm operated) solenoid valves designed for stand-by control of fluid flow and for automatic cycling operations on air compressors, boiler feed pumps, steam generators, temperature controllers, gas burners, motor-generator sets, oil burning furnaces, etc.

The valves are available in the following pipe sizes: ⅛, ¼, ⅜, ½, 1, 1½ and 2 in. They are used for the control of air, water, oil, Freon No. 11, No. 12 and No. 22 refrigerants, natural, manufactured, propane and butane fuel gases, and sulphur dioxide gas. They will operate on line pressures as high as 150 psi and as low as ½ in. of water. Ideal cycling range for these valves is from 40 to 60 cycles per minute.

These valves are supplied with aluminum bodies for gas and air service and brass bodies for oil and water service. Valve seats and armature pilot plungers are stainless steel.

# IN HOTELS



## *Powermaster® Excels in Operating Efficiency!*



*For example:* This large hotel in an Eastern city is supplying heat and hot water for its 300 rooms with this 250 HP Powermaster Packaged Automatic Boiler.

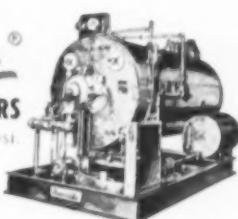
High fuel economy at all loads is one reason why *Powermaster* is a byword for operating efficiency among the men who select, install and operate boilers for hotels as well as for institutions, churches, housing projects, all types of buildings . . . and industrial plants.

Other *Powermaster* advantages include: Cost-saving installation, space-saving compactness,

fast steaming, hospital-clean operation, dependability, maintenance-saving accessibility, fully automatic operation and safety controls and smokeless combustion.

If you're in the market for a boiler, remember—Steam costs go down where *Powermasters* go in. Get the cost-saving story on *Powermaster*. Send now for latest descriptive bulletin.

**D-S**  
*Powermaster®*  
PACKAGED AUTOMATIC BOILERS  
In sizes to 500 HP; pressures to 250 psi.



ORR & SEMBOWER, INC. • Established 1885 • Morgantown Road, Reading, Penna.

SOUTHERN POWER & INDUSTRY for JULY, 1954

## **new equipment (continued)**

For more data circle item code number  
on the postage free post card—p. 17

### **Portable Power Drive**

THE RIDGE TOOL COMPANY,  
**G-12** Elyria, Ohio, has recently developed the "Ridgid" portable power drive for threading, cutting and reaming pipe with hand tools, made with a new wrenchless Speed-Grip chuck.



The tool, which is said to operate on a different principle from conventional hammer chucks, is designed to hold any kind of pipe or rod securely both forward and reverse. To operate, grip-tooth jaws are closed on work by hand wheel, locked lightly, then motor action holds work still tighter. The new power drive handles  $\frac{1}{8}$  in. to 2 in. pipe,  $\frac{1}{4}$  in. to 2 in. bolts, and has ample power for geared tools to 12 in.

### **Self-Sticking Pipe Markers For High Temperatures**

W. H. BRADY COMPANY, 727  
**G-13** W. Glendale Ave., Milwaukee 12, Wis., announces an improvement in their line of Self-Sticking Pipe Markers, which makes them unaffected by extreme temperatures of the pipes to which they are applied.

Markers now have twice the adhesion (32 oz as compared to only 16 oz per inch of width). They stick without moistening to bare or insulated



continuous temperatures from -300 to 300 F; intermittent temperatures to 450 F.

pipes. They replace hand painting and stenciling, and give positive identification for only a few cents per marker. They conform to American Standards Association Std. A-13, with the specific name of the material in the pipe printed in bold, black letters on the proper ASA-specified background color.

patented hexagonal tube which prevents the bucket from being damaged on the side of the case, and also keeps the valve and seat in line. All working parts of the trap are made of heat-treated stainless steel with the exception of the valve and seat which is made of a chrome-nickel alloy to resist corrosion.

### **Steam Trap Design**

THE V. D. ANDERSON COMPANY, 1935 W. 96th St., Cleveland 2, Ohio, has developed a new "Heat-Kwik Super-Silvertop Steam Trap" designed to enable the user to obtain faster heating up, more production, lower steam consumption, longer trap life, and a reduction in the trap capacity faster.



V. D. Anderson Company Heat-Kwik steam traps are available in a complete range of sizes from  $\frac{3}{4}$ " to  $1\frac{1}{4}$ ", suitable for pressures up to 150 psi.

This fast air-venting is accomplished through the use of two separate orifices, one for condensate and a separate bellows orifice for air. When the trap is cold, the bellows orifice is wide open and handles large quantities of air very rapidly. After all of the air is removed through it, the bellows expands and closes the orifice. Thereafter air is removed through the vent hole in the bucket. Since very little air remains in the system the vent hole is said to be of ample capacity.

These new steam traps require a trap factor of never more than 2 to 1.

Construction of the head of the trap permits it to be opened for inspection or servicing without removal from the pipeline.

The inverted bucket is guided on a

### **Magnetic Sweeper**

ERIEZ MANUFACTURING COMPANY, Erie, Pa., announces production of the Sweeperette, a rotary non-electric magnetic sweeper with a detachable magnetic element.

When used as a hand-propelled rolling sweeper along factory aisles, floors, drives and walks, the magnetic tube is passed over small metal chips, filings, nails, tacks, etc., which are attracted to the rotating tube, automatically spreading themselves over its entire surface to a depth of  $\frac{1}{8}$ ".

Unloading the 1" diameter tube is quickly accomplished by removing it from the unit and clearing it of the accumulated metal by means of a neoprene wiper ring.

When used apart from the roller, the magnetic element can be employed for the retrieving of fine ferrous material, as a skimmer or coolant cleaner, as an underwater recovery magnet, or as a magnetic collector in any hard-to-get-at places.

### **Non-Skid Safety Topping For Steps and Floors**

THE MONROE COMPANY, INC., 10703 Quebec Ave., Cleveland 6, Ohio, has developed a non-slip, non-skid safety



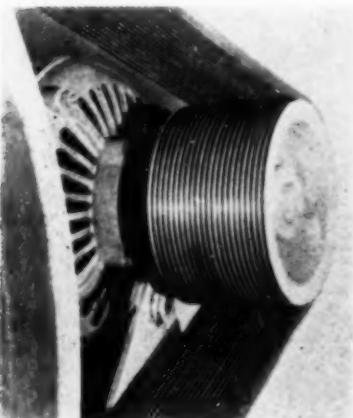
topping for use on steps and floors, known as X-L Veneer.

The product is a synthetic, heavy-bodied plastic material which contains special solvents and abrasive fillers. When applied, it is said to form a thin, tightly-bonded veneer that is slip-proof, wet or dry, and which contributes to the elimination of many accidents.

Easily troweled on, it can be used over concrete, wood, steel, tile, mastic or terrazzo floors. Because it is impervious to oil and grease, it is especially recommended for use around machinery. It is also used for skid-proofing steel floor plates. Other applications include stairways, ramps, catwalks, aisles, shower rooms and lavatories.

#### Power Transmission Belt

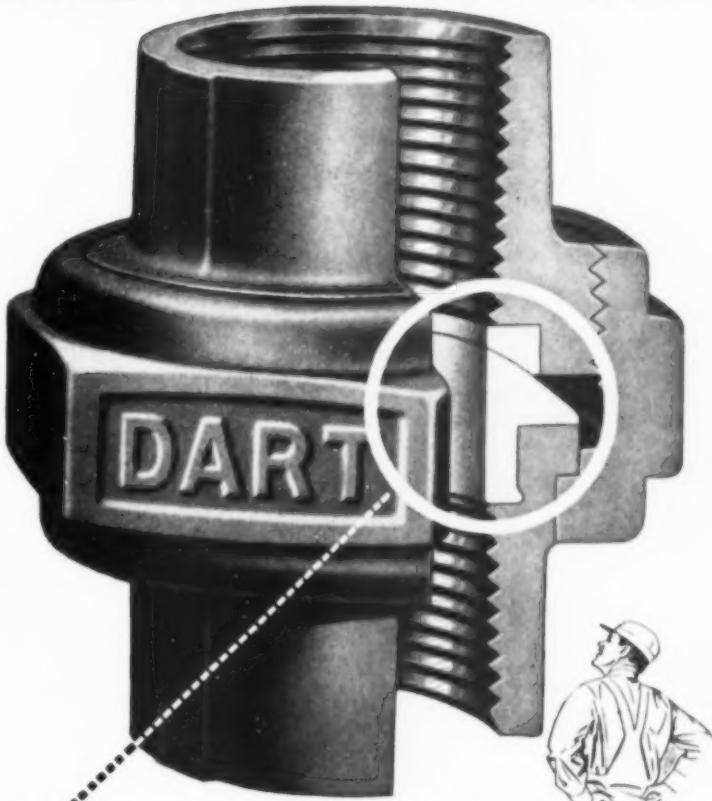
MANHATTAN RUBBER DIVISION, RAYBESTOS - MANHATTAN, INC., Passaic, N. J., has introduced the Poly-V Belt, which is a single, endless rubber belt with a series of parallel V ribs molded lengthwise around the inside circumference, and has an uninterrupted, high-strength member of synthetic cords across its entire width.



Raybestos-Manhattan's Poly-V Belt is ribbed lengthwise to mate precisely with the entire surface of the sheave grooves. Design gives equal horsepower in 1/3 less width, or up to 50% more horsepower in the same width.

Design features of the drive reduce face pressure one half, giving longer life to belt and sheaves. Also, the full drive width and the total traction surface contact prevents belt turnover and progressive sinking in sheave grooves. It eliminates belt matching problems common to multiple V-belt applications. Poly-V is available in two sizes to meet all drive requirements from 3 in. pitch diameter sheaves and 50 in. belt pitch lengths upwards.

# Dart Unions are LEAKPROOF



## This True Ball Joint Makes the Difference



You can't buy an easier-operating, longer-operating, more positive-operating union for any money

#### QUICK FACTS

- Leakproof because precision-machined to a true ball joint and spherically ground
- Extra wide bronze seats (Resist pitting and corrosion)

- Heavy shoulders (Take severe wrenching without harm)
- Nut and Body Practically Indestructible (They're air-refined, high test malleable iron)

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*The Fairbanks Co. — Distributors: Boston • New York • Pittsburgh • Rome, Ga.*

## Equipment . . Supplies . . Methods (Continued)

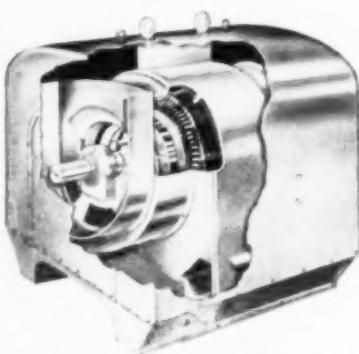
*Free additional information is available to readers of SP&I. Circle the item code number on one of the reader service post cards provided on pages 17-18.*

### Silicone Protected Induction Motors

**G-18** ELECTRIC MACHINERY MFG. COMPANY, 1335 Tyler St., N.E. Minneapolis 13, Minn., is offering new "Sil-Clad" motors which feature complete Silicone insulation on the motor winding, Silicone enamel baked on all exposed metal parts of the motor, and stainless steel on parts subject to air abrasion.

The Silicone has excellent heat resistance, repels water, is inert to corrosion from most air-borne chemical fumes, resists oxidation and sunlight, and is a very good electrical insulator.

The full Silicone treatment of these squirrel-cage induction motors is es-



Sil-Clad motors are offered in ratings of 250 hp and larger.

pecially designed to provide protection in damp, moist, or steamy conditions, in sea coast locations sub-

ject to salt corrosion, in chemically active atmospheres or in other situations which induce deterioration by rusting, corroding or moisture penetration.

### Conveyor Line Unit Booster

**G-19** LAMSON CORPORATION, Syracuse, New York, announces the marketing of a new Unit Booster.

A complete package in itself, the Unit Booster can be incorporated into an engineered conveyor system or can be purchased and installed by any competent mechanic for special purpose jobs. For normal package conveyor loads, it can be used for inclines up to 30 degrees.

Unit Boosters are made of a 5 ft drive and a 5 ft take-up section, which may be joined together to make a 10 ft unit. Lengths of intermediate section may be added to extend the booster in multiple lengths of 5 ft up to 60 ft.

Unit Boosters are available in two widths, 18 in. and 30 in., and can be equipped with any standard type of 3-ply belting. Standard gear head motors from  $\frac{1}{2}$  to 1 hp are used to drive the 8 in. pulley and are mounted under or on the side of the drive section. Accessory equipment includes a tail belt powered by the unit booster and floor or ceiling supports.

### Portable Vacuum Cleaner

**G-20** U. S. HOFFMAN MACHINERY CORP., Air Appliance Division, 105 Fourth Avenue, New York, has introduced a new 5 hp portable vacuum cleaner, designed to operate two 50 ft,  $1\frac{1}{2}$  in. hoses simultaneously—or one 75 ft length of  $1\frac{1}{2}$  in. hose.



The Hoffco-Vac 35 has a large dust bucket and is equipped with an exhauster and motor which produce 6.5 in. hg suction. The new machine is recommended for use as a general housekeeping tool to keep floors, wall, lights and other dust catchers around the plant clean.

**EXTRA YEARS**  
**OF MORE DEPENDABLE POWER**  
**and at less cost per pound of steam**

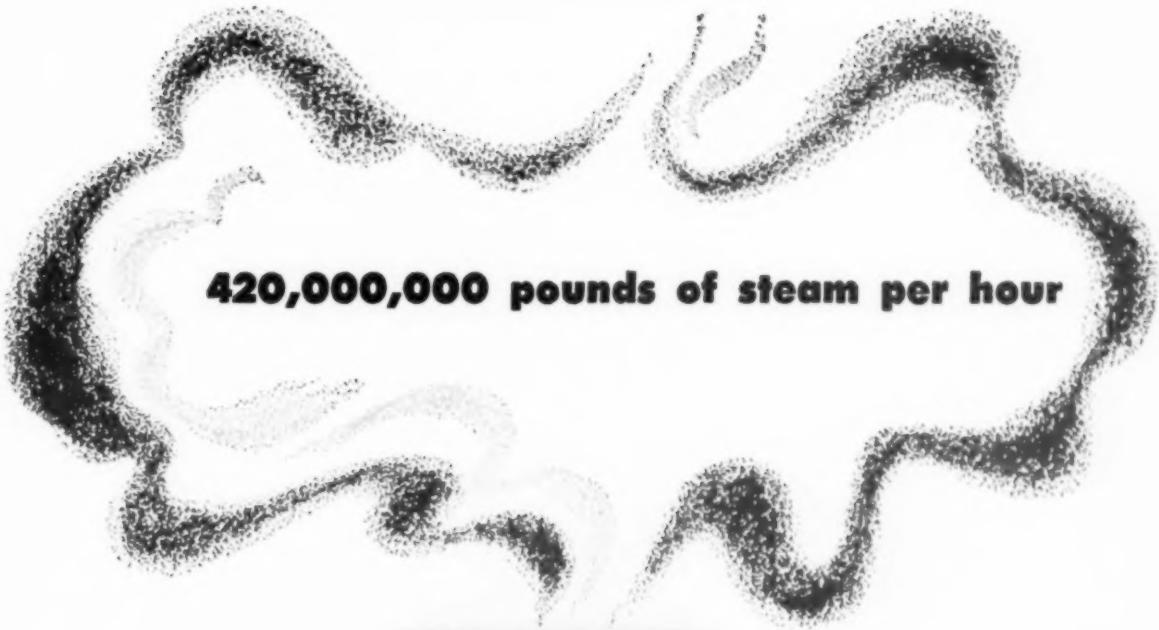
**TODD BURNERS**  
**GAS OR OIL**

**COMBUSTION EQUIPMENT DIVISION**  
**TODD SHIPYARDS CORPORATION**

81-16 45th Avenue

Elmhurst 73, N. Y.





**420,000,000 pounds of steam per hour**

*served by*  
**LJUNGSTROM**  
*Air Preheaters*

That's the amount of new steam capacity, installed or on order *since 1946 alone*, designed to utilize the economies available with the Ljungstrom Air Preheater.

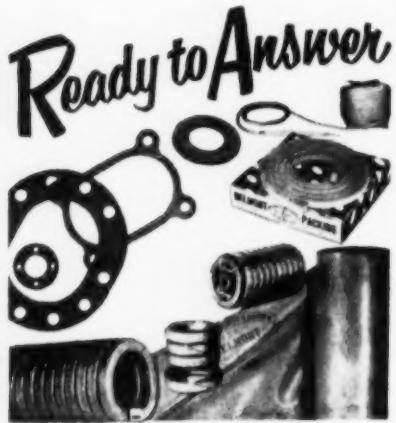
This total capacity includes nearly 70% of all new central station boiler installations, as well as the major portion of industrial boilers in the over-250,000 pound per hour range.

The conclusion is obvious: Boiler users everywhere realize that the fuel-saving, performance-boosting abilities of the Ljungstrom make it the *most economical heating surface on the modern boiler*.

**The Air Preheater Corporation**

60 East 42nd Street, New York 17, N. Y.

# BELMONT PACKINGS



## Your Hurry Call!

Belmont Packings . . . in spool, spiral, ring, reel, coil and sheet form . . . each in a wide range of specially formulated materials to meet the diverse requirements of modern industry.

Once a routine maintenance job, selection and application of packings is now a specialized field requiring experience, dependability and real devotion to service. **HOWEVER, THESE REQUIREMENTS NEEDN'T ADD TO YOUR ALREADY HEAVY RESPONSIBILITIES!** There's always a Belmont packings distributor to help you anticipate trouble and . . . when emergencies do arise . . . come to your aid.

That's what we mean when we say that Belmont packings are ready to answer your Hurry Call. They're not only made right . . . they're sold right . . . available when you want them, where you want them . . . through a Belmont Distributor . . . dedicated to **YOUR** service.

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AND ADDRESS**

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for Steam • Water • Oil • Gas • Air  
Acids • Alkalies • Ammonia

THE

**BELMONT**  
PACKING AND RUBBER CO.

Butler and Sepviva Streets  
Philadelphia 37, Pennsylvania

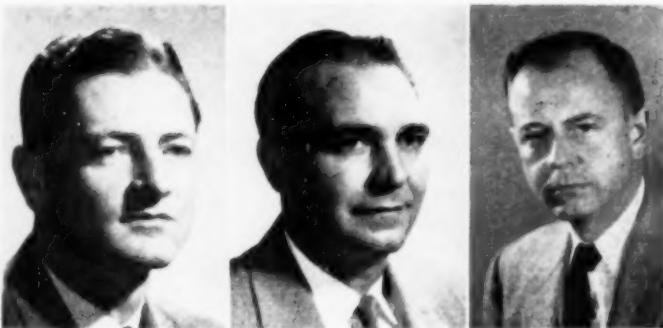


Rings • Spirals • Coils • Reels  
Spools • Sheets • Gaskets

There's a Belmont Packing for every service

## News for the South and Southwest (continued)

(Starts on page 8)



John Lee, Lloyd Kagley, and Donald Mundale

### Oakite—Fla., Tenn., N. C.

OAKITE PRODUCTS, INC., manufacturers of industrial cleaning, sanitizing, and metalworking materials, have announced the assignment of three new technical service representatives.

JOHN N. LEE, a graduate of David-

son College, North Carolina, will serve accounts in the MIAMI area; LLOYD W. KAGLEY, for the past eight years with a major oil company in Knoxville, Tenn., will service Oakite accounts in that area, and Donald O. Mundale will represent the company in Asheville, N. C.

### Clarkson Tech Honors Eugene W. O'Brien

EUGENE W. O'BRIEN, vice-president, W. R. C. SMITH PUBLISHING COMPANY and managing director of SOUTHERN POWER & INDUSTRY, received from Clarkson College of Technology the honorary degree of Doctor of Humane Letters at commencement exercises in Potsdam, New York on June 6, 1954.



Eugene W. O'Brien

endowed technical school with an enrollment of over 1000, established a curriculum which leads to a Bachelor of Science Degree, with the major in Industrial Distribution. The new course, according to Clarkson's president, DR. WILLIAM G. VAN NOTE, formerly research director at North Carolina State University, climaxed several years' planning by the college, and by members of the Joint Educational Aids Committee of the National and Southern Industrial Distributors' Associations and of the American Supply & Machinery Manufacturers' Association, Inc.

### Goodyear's Gadsden Plant Has 25th Anniversary

Celebration of the 25th anniversary of GOODYEAR TIRE & RUBBER CO.'s GADSDEN, ALA. plant, first rubber products plant south of the Mason-Dixon line, was held May 14-15, with open house and a barbecue for 12 to 15 thousand persons as highlights of the program.

E. J. Thomas, Goodyear president, delivered a congratulatory address to employees and their families, and awarded lapel pins to 20 employees who have completed 25 years' service with the Gadsden plant.

The Gadsden plant is second largest in the Goodyear organization. Its plant produces tires, tubes, shoe products and military materials.

Mr. O'Brien, a graduate of Brown and Yale Universities in both electrical and mechanical engineering, has been associated with SOUTHERN POWER & INDUSTRY since 1927. He has been active in a number of technical, engineering and educational associations, and was national president of the American Society of Mechanical Engineers in 1946-47.

Last fall Clarkson Tech, a privately

## **Graybar to Distribute Diamond Industrial TV Eqpt.**

THE DIAMOND POWER SPECIALTY CORPORATION, of Lancaster, Ohio, announces the appointment of GRAYBAR ELECTRIC COMPANY, INC., as national distributors of a new line of industrial television equipment. Diamond will continue to build and to market the "Utiliscope" line of industrial television equipment through its own branch offices, as in the past.

## **J. Wally Keck, Jr. Opens Consulting Engineering Firm**

J. WALLY KECK, JR., with offices at 3110 Roswell Rd., ATLANTA, GEORGIA, has established a consulting engineering firm specializing in industrial power and processing, heating, ventilating, air conditioning and plumbing fields.



J. Wally Keck, Jr.

Mr. Keck, registered engineer in Georgia, South Carolina, Florida, and New York, and a Mechanical Engineering graduate of Georgia Tech, has been associated for the past two years with W. D. Taulman & Associates, manufacturers' agents of Atlanta. Previous engineering experience included five years work in the service department, and boiler and condenser design departments of the Foster Wheeler Corporation in New York.

## **U. S. Rubber Names Boulware**

LOUIS M. BOULWARE has been appointed assistant production manager of the textile division of UNITED STATES RUBBER Co., to supervise production at the company's textile division plants in SCOTTSVILLE, VA.; GASTONIA, N. C.; HOGANSVILLE, GA.; SHELBYVILLE, TENN.; and WINNSBORO, S. C. His headquarters are at Winnsboro.

Mr. Boulware joined the company in 1938. He is a graduate of Clemson College, S. C., where he majored in textile engineering.

You can have **Double Safety**  
through **Double Supervision**  
**of your boiler water levels**



## **Thousands of boilers like yours protected by this Safety Team**

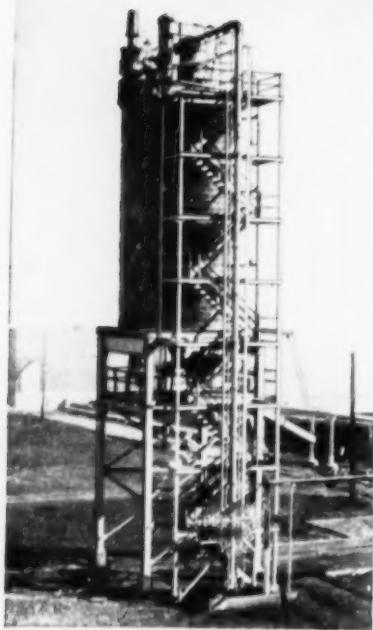
Depending on one source of water level checking is shortsighted these days. Make doubly sure with the Reliance Safety Team. The Alarm Water Column with sensitive float-operated mechanism faithfully warns with a whistle blast if level reaches unsafe low or high positions. But operators rarely let that happen when they have constant access to the accurate EYE-HYE Remote Gage reading, located conveniently at eye-level on panel or wall.

EYE-HYE's green indicating fluid is now more evenly illuminated by a fluorescent lamp. And EYE-HYE can be equipped to control lamps or horns in still other plant locations. Make your boiler extra safe like the many in steam plants everywhere enjoying Safety Team water level supervision. Write the factory or your nearest Reliance representative.

The Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, O.

*The name that introduced safety water columns....in 1884*

**Reliance®**  
BOILER SAFETY DEVICES



A National Installation at the CHEMSTRAND CORPORATION in Decatur, Alabama

**turn the  
EXPERIENCE  
OF OTHERS  
to your advantage**

Many important engineers have learned that National Ash Conveyor Systems save money. A survey of your own plant will cost you nothing but it may result in cutting your expenses as it has the plants listed.

When you install a

**NATIONAL PNEUMATIC  
STEAM ASH REMOVAL  
SYSTEM**

you can count on long life with minimum down time for repairs. Rugged construction, careful engineering and expert National Servicing have made strong friends of our clients.

**Representative NATIONAL INSTALLATIONS:**

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COMPANY, INC.**

25 INDUSTRIAL AVENUE  
FAIRVIEW, NEW JERSEY

Manufacturers of The National  
ChipVeyor System For Metal Turnings—Furnace Doors—Feeders—Ash  
Gates and Related Equipment.

## **Automatic Welder Speeds Laying of 12-Mile High Pressure Aluminum Pipeline—Texas**

A NEW welding machine is being used in laying of the 12-mile high-pressure pipeline between the White Point gas field near Corpus Christi, Texas, and the Reynolds Metals Company LaQuinta alumina plant. It is claimed that the new automatic welder, developed by Reynolds in conjunction with Air Reduction Sales Company, makes aluminum pipeline competitive with steel in cost, without considering many additional advantages of aluminum pipe.

### **Machine Operation**

The machine welded 40 ft sections of 8 and  $\frac{3}{4}$ " aluminum pipe in an average time of four minutes for a five pass weld, compared to about eight minutes or more for welding pipe in place by hand, the method commonly used for steel pipe and which heretofore has created technical problems in the welding of aluminum pipe. Suspended over the line by a side boom, the automatic welder is equipped with quick-acting clamps which securely grip the pipe. Pressing a button starts the welding, and automatic controls maintain proper conditions at the arc. When the weld is complete, the machine automatically stops, reverses itself, and returns to the starting position. The clamps are then released, and the machine is moved to the next weld.

W. B. Moore, Reynolds' manager of chemical and petroleum market

sales, said: "Development of an automatic method of welding has been the missing link in making aluminum competitive with steel pipe for high-pressure gas lines." Mr. Moore explained that aluminum already is competitive for low-pressure gas and oil lines, such as field gathering systems.

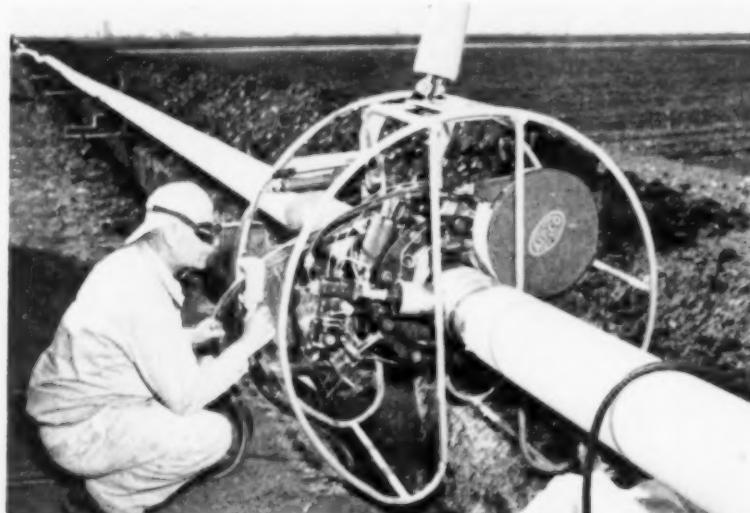
The largest diameter pipe now made by Reynolds is 12", but the aluminum firm now is planning facilities at its Phoenix extrusion plant for manufacture of pipe up to 32" in diameter.

The welds made during the laying of the 12-mile high-pressure link were subjected to pressure as high as 1800 psi, and held firmly. The 40-ft aluminum pipe sections used weigh only 320 lb each, while the same size section of steel pipe weighs about 1000 lb. Reynolds technicians pointed out that this makes possible savings in handling, equipment and labor which virtually offset the higher cost of aluminum pipe.

### **Advantages of Aluminum**

The group of petroleum and welding experts who witnessed the Texas demonstration were told that aluminum pipe has many additional advantages over steel; aluminum is non-corrosive and is not attacked by the sulphur present in "sour" crude oil.

Although pipe in the new White



NEW TYPE automatic pipe welder, developed by Reynolds Metals and Air Reduction, was used in laying the 12-mile pipeline serving the Reynolds Metals Company

LaQuinta alumina plant in Texas. Pipe welds were made which will withstand 25% greater bursting pressure than heretofore obtainable by the best standard methods.

FISHER

1880

New!  
New!  
New!



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## Large Capacity

### SERIES 95 PRESSURE REGULATOR

For steam, air, gas, oil, water or other fluid. Sizes  $\frac{1}{4}$ ",  $\frac{3}{8}$ ",  $\frac{1}{2}$ ",  $\frac{3}{4}$ ", 1". Outlet pressures from 2 to 30 psi; 15 to 150 psi. Easily installed—no external control lines.

Bulletin C-95 illustrates and describes new internal construction features which give higher capacity and close regulation. Write for your copy today.

**FISHER GOVERNOR COMPANY**  
**MARSHALLTOWN, IOWA**

LEADS THE INDUSTRY IN RESEARCH FOR  
BETTER PRESSURE AND LIQUID LEVEL CONTROL



## FURNAS ELECTRIC

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- A Cost Saving Catalog of Electric Motor Control.
- Many New Control Items Listed.

## YOU SAVE

with the right control for the job. Now with in-between sizes in the magnetic starter line, you buy and pay only for the capacity you need.

The new catalog includes drum controllers designed for your requirements. These durable, economical controllers are for manual operation of reversing and multi-speed motors. Also time tested, dependable pressure switches for air compressors and water systems.

*Write* TODAY

for this new catalog to help you save money when buying Electric Motor Control. FURNAS ELECTRIC COMPANY, 1047 McKee St., Batavia, Ill.



**FURNAS**  
ELECTRIC

Batavia, Illinois

## News for the South and Southwest (continued)

Point-LaQuinta line is wrapped, this is unnecessary in many instances. If aluminum pipe is wrapped, it does not require cleaning after storage to remove mill scale or rust. Wrapping of aluminum pipe therefore costs about 30% less than for steel.

Maintenance costs for aluminum pipe are notably lower, because painting of aluminum used in overhead or exposed installations is unnecessary. The inside surface of aluminum pipe is so smooth it approaches that of glass tubing. This means much less friction and less pressure drop in aluminum lines, with consequent savings in transmission costs.

The major advantage of aluminum over steel, however, is the weight differential. Aluminum, which weighs about one-third as much as steel, can be used for aerial river crossings and bridge crossings where steel is impractical.

The line being laid near Corpus Christi is the first full-scale use of the newly-developed automatic welding machine. Short test lines with smaller diameter pipe were laid earlier at Listerhill, Alabama, for the Alabama-Tennessee Natural Gas Company, and at Jal, New Mexico for the El Paso Natural Gas Company. Both installations proved successful and made it possible to perfect the process.

### Reliance Electric Adds to Staff—Atlanta & Houston

The addition of application engineers to the ATLANTA and HOUSTON sales offices of the RELIANCE ELECTRIC & ENGINEERING COMPANY, Cleveland, was announced recently.

These engineers, who have already assumed their new assignments, are: ARTHUR J. STOCKSLAGER, Atlanta district sales office, 427 Candler Building, who reports to Emory G. Orahod, Southeastern district manager; and WALTER A. THORNE, Houston district sales office, 1103 Sterling Building, who reports to F. A. Denison, Southwestern district sales manager.

Stockslager joined Reliance in 1953. He is a graduate in mechanical engineering from Duke University and a member of the ASME.

Thorne also joined Reliance in 1953. He is an electrical engineering graduate of the University of Toronto and of the Harvard Graduate School of Business Administration.

### Benjamin Electric Mfg. Co. Nashville and Atlanta

Appointment of A. A. MICHEL to head the Nashville Territory has been announced by the BENJAMIN ELECTRIC MANUFACTURING COMPANY, Des Plaines, Illinois, makers of industrial and commercial lighting equipment.

Mr. Michel has been associated with the lighting industry for many years, having previously been with the Goodrich Electric Co. and Appleton Electric prior to his joining Benjamin in August, 1953.

R. H. HILLER has joined Benjamin's Atlanta staff. He was formerly District Representative in Atlanta for Curtis Lighting. He is an electrical engineering graduate and has taken an active interest in all phases of lighting activity and been active in the Illuminating Engineering Society since 1947.

### B&W Promotes G. A. Profitta

G. A. PROFITTA has been named regional manager of the Manufacturing Department of the Boiler Division of THE BABCOCK & WILCOX COMPANY. Previously Mr. Profitta had been co-ordinating manufacturing and production activities at the WILMINGTON, N. C., and BRUNSWICK, GA., plants of the company. In his present position, his work will embrace these plants in addition to those at Alliance, Ohio, WEST POINT, Miss., and PARIS, TEXAS.

Mr. Profitta joined the company in 1929. In August 1947 he was transferred to the work of erecting stationary boilers, where he remained until March 1952, serving as District Erector of the New Orleans district from January 1950.

### Armco Steel—Houston

ARMCO STEEL CORPORATION has acquired all common stock of Southwest Steel Products.

Southwest was incorporated in 1946. The company has three plants in Houston with about 150 employees.

RUSSELL L. JOLLEY continues in charge of the business as a wholly-owned subsidiary of Armco. The company is liquidating its Southwest Steel Plate Division and in the future will concentrate on the production of bar joists, roof deck, steel forms, and other accessories for the construction industry.

**American Viscose Promotions  
—Fredericksburg, Virginia**

Promotion of EUGENE W. CORNWELL, chief plant engineer of the FREDERICKSBURG, VA. cellophane plant of the SYLVANIA DIVISION of AMERICAN VISCOSA CORPORATION, to advisory engineer of the division was announced recently by DR. G. W. LOW, JR., plant manager.

EDWARD L. WOOLLEY, assistant plant engineer of the corporation's acetate plant at Meadville, Pa., will succeed Mr. Cornwell as plant engineer. Mr. Woolley will take over as chief plant engineer Sept. 1.

NICHOLAS E. CARR, manufacturing superintendent of the Marcus Hook, Pa. rayon plant, was transferred to the Fredericksburg cellophane plant on June 1 as technical assistant to the plant manager.

**Gas Measurement — W. Va.**

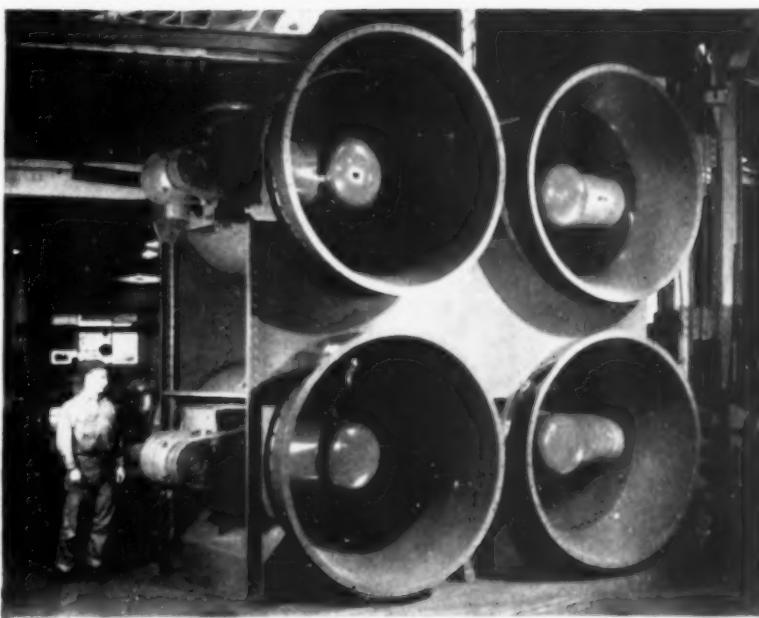
The 14th annual Appalachian Gas Measurement Short Course will be held at West Virginia University, Morgantown, W. Va., August 23-25, it was announced today.

Only course of its type given east of the Mississippi, the session is attended annually by measurement and control engineers and other technical personnel representing the petroleum, gas and chemical industries. Attendance is expected to reach about 750 this year.

Subjects to be covered will include fundamentals of gas measurement and special sessions on domestic meters, large capacity meters, orifice meters, auxiliary measurement instruments, automatic control instruments, planning and design of installations, and pressure regulators, motor valves and related equipment.

Committee chairmen for the event are: C. G. MOORHEAD, measurement superintendent of Hope Natural Gas Company, Clarksburg, W. Va., general chairman; A. M. HUTCHINSON, measurement superintendent of Ohio Fuel Gas Company, Columbus, Ohio, program chairman; J. W. CHRISMAN, meter superintendent of East Ohio Gas Company, Cleveland, Ohio, practical methods; WALTER L. AVIS, measurement superintendent of West Virginia Gas Corporation, Charleston, W. Va., education; EARL A. MOWREY, Eastern sales representative of Rockwell Manufacturing Company's Macnick Division, publicity; and R. W. LAIRD and R. E. HANNA, JR., of the University faculty, exhibits committee and housing and registration, respectively.

*excess*  
**TAKING THE  $\wedge$  HEAT OFF  
THE POWER PLANT!**



**Compact Unit Exhausts 180,000 CFM from Large Power Plant**

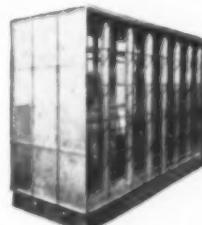
This "Buffalo" Unit in a prominent eastern power plant building is made up of four 54" Type "B" Vaneaxial Fans, each handling 45,000 cfm at 11 $\frac{1}{4}$ " static. Size of unit is 15' x 12' x 8' thick including motors and drives, and is suited for use in existing buildings. You can install "Buffalo" Axial Flow Fans in minimum space for high-efficiency, high-velocity cooling action. Full range of sizes. Write for Bulletin 3533-C.

**A "Buffalo" UNIT FOR YOUR COMFORT COOLING JOB!**

"Buffalo" Type "BL" Limit-Load Ventilating Fans offer you a range of 1000 cfm to 500,000 cfm in exceptionally quiet, efficient, stable delivery for ventilation and air conditioning supply — described in Bulletin F-100. "Buffalo" also builds Heavy-Duty "NV" Propeller Fans in capacities from 5,000 to 150,000 cfm, as well as a complete line of Air Cleaning and Air Cooling Equipment. Write us today for literature on comfort cooling for your power plant!



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Air Washer



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## News for the South and Southwest (continued)

### Detrex Exhibit Shows Ultrasonics in Action

THE DETREX CORPORATION of Detroit has "taken to the road" to tell American industry the story of advances in the use of ultrasonic energy for the precision cleaning of metal.

It was just a year ago that Detrex announced that it had taken high-frequency sound energy out of the laboratory stage and had developed its fully conveyorized Soniclean Process—its ultrasonic metal cleaning system that was practical for the needs of modern industry.

Inquiries and requests for further data and demonstrations have poured in ever since, and to answer them, Detrex first tackled the huge job of sorting through and indexing them. Then followed the publication of a technical brochure. The next step was the formation of a special team of ultrasonic demonstrators and the preparation of an itinerary that will keep them on the road for an indefinite period.



Kermit D. Collom (center), in charge of ultrasonics sales, Detrex Corporation, shows speed and thoroughness with which sound energy degreases metal part.

Headed by KERMIT D. COLLOM, in charge of ultrasonics sales, installation and service, demonstrators will

show ultrasonics in action with the aid of a carefully-assembled, complete kit including a small degreaser.

### American Air Filter Names Fitch Vice President—Ky.

HOWARD M. FITCH, general manager of the Herman Nelson Division, Moline, Ill., has been elected a vice president of AMERICAN AIR FILTER COMPANY, INC., LOUISVILLE, KY.

Joining AAF as a sales engineer in June, 1936, Mr. Fitch served as production manager, manager of the legal and patent department, and assistant to the executive vice president, before becoming manager of the Herman Nelson Division in 1953. He developed the Cycloid oil-bath air cleaner used on large stationary diesel engines.

He received the degree of Bachelor of Science in Mechanical Engineering from the University of Kentucky in 1930, and his Bachelor of Laws degree from Jefferson School of Law (now University of Louisville) in 1942. He is a member of the American Society of Mechanical Engineers, the American Society of Heating and Ventilating Engineers, the Kentucky Society of Professional Engineers, and other engineering and legal associations.

### G-E Mobile Transformer for Louisville Gas & Electric

A mobile transformer, which will be one of the largest ever built for highway use, has been ordered by the LOUISVILLE GAS AND ELECTRIC COMPANY, it was announced recently by the GENERAL ELECTRIC COMPANY's Power Transformer Department, Pittsfield, Mass.

The transformer will be used to replace equipment on the line during emergency periods or for general maintenance and will be mounted on a 75-ton, low-bed semi-trailer. It will be a forced-oil cooled, three-phase unit rated 25,000 kva, 60 cycles. Designed as a combined auto and straight transformer, it will have four windings with voltage ratings of 138,000 GrdY, 69,000 GrdY, 37,000 GrdY, and 14,000 volts.

Because of the many windings, 13 bushings will be required. Differential current transformers mounted on each bushing will permit protection for the transformer in case of faults. Power for the pumps and fans of the cooling equipment will be provided by a control power transformer within the main unit.

An external control cabinet will

## "Electricity and Electrical Power"

### *Basic information on the fundamentals of electricity for the first time available in ONE Volume!*

A limited edition of this important handbook has just been printed and is available to subscribers to SOUTHERN POWER AND INDUSTRY only. Order your copy NOW with a new or renewal subscription to this magazine.

A series of seven articles, "Electricity and Electrical Power" by Roy W. Wages, industrial engineer for Georgia Power Company, was published last year in SOUTHERN POWER AND INDUSTRY and received wide attention and favorable comment from plant engineers in the South and Southwest.

Demands for reprints of this series became so great that we have had all the articles bound in one volume. This useful 72-page book is now available to SOUTHERN POWER AND INDUSTRY subscribers exclusively.

In simple, practical terms, Mr. Wages makes clear the mysteries

of electricity all the way from explaining and defining a volt to a discussion of the sine curve of alternating current motors. The book is liberally illustrated with diagrams and pictures which help make the text crystal clear. Throughout the pages, the author does everything possible to simplify the presentation of facts for easy study and understanding.

Here is a book you will want to keep for reference and for training periods. Pocket sized, it is convenient to carry anywhere . . . for checking right on the job.

For three dollars, you get a three-year subscription to SOUTHERN POWER AND INDUSTRY plus "Electricity and Electrical Power"!

The editors will welcome you into the growing family of SOUTHERN POWER AND INDUSTRY readers.

contain a panel for mounting phase sequence and undervoltage relays, as well as a terminal board for connecting the customer's leads to the control devices and current transformer secondaries.

#### Murray Co. of Texas Modernizes Atlanta Plant

The ventilating Fan Division of THE MURRAY COMPANY OF TEXAS INC. has just completed one of the most extensive expansion and modernization programs in its entire industry.

All Murray ventilating fans, attic and window, are manufactured in the ATLANTA, GEORGIA, plant of the company. Production facilities at this plant have been expanded to allow a capacity of more than ten times the previous output.

The latest in machine tool design and plant efficiency engineering have been incorporated into this new expanded unit—new conveyor and assembly line system, baking ovens, anodizing equipment, one of the largest bed automatic presses made, new electrically operated spot and extended welders—all providing exact specification production and efficient service.

#### Alcoa Production Under Way — Bauxite, Arkansas

The first production unit of Alcoa's new Chemical Products Plant is now in full operation. CARL R. STOUT, manager of Bauxite Works, of which the new ALUMINUM COMPANY OF AMERICA plant is a part, announced that shipments are being made from the plant on a routine basis.

The first unit is one of four—each for separate products—that will comprise the Chemical Products Plant when it is completed. The four groups of chemicals to be produced are: Hydrated Aluminas, C-30 Series; specially calcined aluminas; ground and blended special aluminas; and Tabular Aluminas. Production of all Alcoa Chemicals has been maintained previously at Alcoa's East St. Louis (Ill.) Works, which will continue to supply the rest of Alcoa's alumina chemicals, as well as its fluoride chemicals.

C-30 Hydrates, now being produced, are used primarily in the production of iron-free alum, silica-alumina catalysts, sodium aluminate, and heat resisting glass. Production of C-30 Hydrates at Bauxite will be in three grades, which differ primarily in chemical purity and particle size.

## For BOILER BLOW-OFF Safety



Standard  
Quick-Operating  
Everlasting Valve

Everlasting  
Y Valve

Everlasting  
Angle Valve

These Everlasting Valves are assuring safety in boiler plants all over the country. Each type is stoutly built, with ample strength, resistance to wear, and lasting tightness. Angle and Y designs have interchangeable parts for each size. The three types can be arranged in any combination as Duplex Boiler Blow-Off Units. All Everlasting Boiler Blow-Off Valves conform with ASME Codes, and are available in a range of sizes for pressures up to 600 psig.

*Two of the many available combinations of EVERLASTING Duplex Boiler Blow-Off Units*



Write for descriptive  
Bulletin

EVERLASTING VALVE CO., 53 Fisk St., Jersey City 5, N. J.

# Everlasting Valves

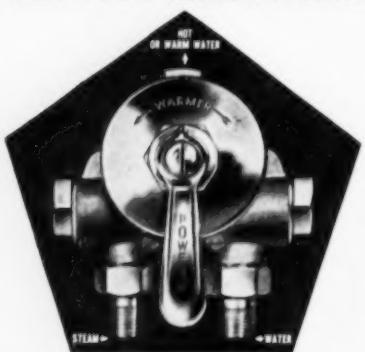
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EV30Z

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*For a Small,  
Localized Supply of Warm or*

# HOT WATER *Use* POWERS STEAM and WATER MIXERS



**ECONOMICAL**—Quickly pay back their cost. Thousands now in use. *Easy to install.* Requires steam and water pressures above 10 lbs. Steam is mixed directly with water.

**MANY USES**—Industrial processes; 180° F. sterilizing rinse water for dishwashers; washing oil drums, trucks, etc.



**TEMPERATURE RANGE**—Any temperature desired between that of incoming water and 200° F.

**HAS PRESSURE EQUALIZING VALVE**—which prevents delivery temperature changes caused by fluctuating pressures of steam or water.

**SMALL SIZE**— $\frac{1}{2}$ " pipe size can be held in the palm of the hand, weighs 12 lbs.,  $\frac{3}{4}$ " size weighs 23 lbs.

**CAPACITIES**—based on steam and water at 45 lbs. pressure each, water at 60° F. and delivery temperature of 160° F.;  $\frac{1}{2}$ " size = 3 gals. per min.;  $\frac{3}{4}$ " size = 8 gpm. Mixing steam with 140° F. water increases delivery about 75%. Often used as a small booster heater.

**WRITE for bulletin 369**



**THE POWERS REGULATOR CO.**  
3400 Oakton Street Skokie, Illinois

Please Send Bulletin 369.

Name.....Title.....

Firm Name.....

Address.....  
1333 Spring St., Atlanta, Ga. 101 N. Elm St., Greensboro, N.C.

## News for the South and Southwest (continued)

### Safety Socket Screw Co. Names Sou., SW, Repr.

The appointment of JOHN T. EVERETT & COMPANY, MEMPHIS, TENNESSEE, as Southern and Southwestern sales representative has been announced by SAFETY SOCKET SCREW COMPANY, Chicago, manufacturers of the "Blue Devil" line of socket cap screws, socket set screws, stripper bolts and other socket screw products. The Everett organization, headed by W. N. WILKERSON, was founded in 1913, and, in addition to its Memphis

headquarters, has offices and warehouses in Atlanta and Houston, with representatives in other key Southern cities.

### Morse Chain Co.—Texas

Appointment of NAVARRO SUPPLY COMPANY of PECOS, TEXAS, as new distributor of Morse mechanical power transmission products is announced by MORSE CHAIN CO., 7601 Central Ave., Detroit 10, Michigan.



"The Early Bird"—world's first incremental cost computer for delivered power—being shipped to the Southern Company, Birmingham, Alabama.

## Computer Will Automatically Calculate Cost of Power on Southern Co. System

A new electronic computer which automatically calculates the cost of power delivered by each station in the complex SOUTHERN COMPANY SYSTEM is being installed in the company's power supply coordinating station at Birmingham, Ala.

The computer, the first of its kind ever built, was designed and manufactured by LEEDS & NORTHRUP COMPANY, Philadelphia instrument firm.

With the help of this computer, and its complementary equipment, the power supply coordinator at Birmingham will supervise the loading of generating stations in the Southern Company System. These include Alabama Power Company, Georgia Power Company, and Gulf and Mississippi Power Company. After fuel costs at each station have been set on the

computer, the electronic brain takes into account transmission losses and generating costs in arriving at the ultimate cost of delivered power.

Nicknamed "Early Bird," after E. D. Early, manager of the Southern Power Company pool, who conceived the idea, the computer is unique in that it uses actual generation values that exist at any instant as provided by telemeters. Hence the cost of power delivered from any particular generating station is based on actual operating conditions.

Hand operated dials, however, are provided so that the power supply coordinator can divorce the computer from the telemetering instruments to determine the desired loading schedule under any set of conditions he wishes to set up.

### **Westinghouse Names Baker District Engr. in Carolinas**

JOHN F. BAKER, has been appointed district engineer for the WESTINGHOUSE LAMP DIVISION'S NORTH AND SOUTH CAROLINA DISTRICT.

Baker has been assistant regional engineer at the Company's regional office in Atlanta since March 1953. He will make his new headquarters at the district office, Charlotte, N. C.

Baker came to Westinghouse through the Company's graduate student training course in 1948, and later was assigned to the southeastern regional office in Atlanta, as a lamp application engineer.

As district engineer he will be responsible for keeping public utilities, industrial and lighting engineers, architects, teachers, and electrical maintenance men in the Carolinas aware of the newest developments in lamps and lighting.

### **Southwestern Gas & Electric Company Promotions**

J. ROBERT WELSH has been named vice president and general manager of SOUTHWESTERN GAS AND ELECTRIC COMPANY, it has been announced by Frank M. Wilkes, president. At the same time, Wilkes reported that GEORGE PRENDERGAST, Marshall, Tex., attorney, had been elected a member of the company's board of directors at the annual stockholders meeting.



J. Robert Welsh

Welsh had served as superintendent of operations since 1945 and has been a member of the board since 1948. He was made a vice president in 1949. A native of Peoria, Ill., Welsh received a degree in civil engineering at the University of Illinois in 1924. He was chief engineer for the L. E. Myers Co., before coming to Southwestern.

Prendergast has served as Southwestern's attorney in East Texas for 30 years.

### **Robertshaw-Fulton Controls Names Eastern Tenn. Repr.**

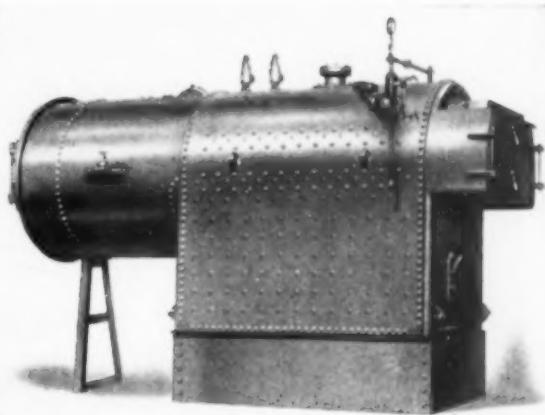
THE FIELDEN INSTRUMENT DIVISION of ROBERTSHAW-FULTON CONTROLS COMPANY has named EQUIPMENT SALES CORPORATION, Kingport, Tenn., as its sales representative for the Eastern Tennessee area, including CHATTANOOGA, KNOXVILLE, OAK RIDGE and NASHVILLE.

S. E. ABERNATHY, former head of instrument engineering for Tennessee Eastman, is president of the sales agency.

### **A-C Names Burrus, St. Louis**

C. W. Schweers, vice-president and director of sales of ALLIS-CHALMERS general machinery division, has announced that J. H. BURRUS, JR., formerly Milwaukee district office manager, has been named manager of the Midwest region succeeding O. V. Tally, who held the post since 1950. This region now consists of the St. Louis, Indianapolis, Evansville, Louisville, Kansas City, Wichita, and Omaha offices, as well as the Memphis district. Headquarters are in St. Louis.

## **POWER with POWER to spare**



### **A NEW DOUBLE PASS ALL-PURPOSE INDUSTRIAL AND HEATING BOILER**

#### **SOUTHERN MADE FOR SOUTHERN TRADE**

Made in sizes from 44 H.P. to 153 H.P. S.B.I. rating with pressure to 150 lbs. Designed for coal, gas or oil firing, the New Lucey Double Pass Boiler can be furnished complete as a package unit.

This boiler is in addition to our regular line of single pass fire box boilers which we have been making since 1918.

WRITE FOR BULLETIN NO. 153 FOR COMPLETE SPECIFICATIONS

## **LUCEY BOILER AND MANUFACTURING CORPORATION**

**CHATTANOOGA,**  
1514 CHESTNUT ST.  
CHATTANOOGA

**TENNESSEE**  
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HOUSTON, TEXAS

# Using Woven Wire Conveyor Belts?



## get to know your Cambridge man!

Every Cambridge Sales Engineer—both in the field and the home office—is thoroughly trained in every phase of wire belt engineering.

That means he's equipped to give you complete, accurate advice and recommendations—based on our years of leading the development and applications of woven wire conveyor belts. You can be sure that the belt he recommends for you will give top performance, because every Cambridge belt is selected and fabricated to meet individual requirements. No two belts are alike. The belt you buy is designed for you alone.

Moreover, every step of belt fabrication at the plant is closely inspected to make sure the finished belt meets rigid specifications for size, mesh count and mesh opening.

So, for complete satisfaction with belt performance—get to know your Cambridge man. He's listed under "Belt-Mechanical" in your classified phone book—or write us direct.

**IF YOU'RE NOT USING WIRE BELTS  
let us tell you how they can boost  
production and cut costs by combin-  
ing movement with processing. No  
obligation, of course.**

### FREE CATALOG

Gives complete specifications for Cambridge wire belts, provides you with background knowledge for discussion with your Cambridge Sales Engineer.



### The Cambridge Wire Cloth Co.

Dept. Y • Cambridge 7, Md.



## News for the South and Southwest (continued)

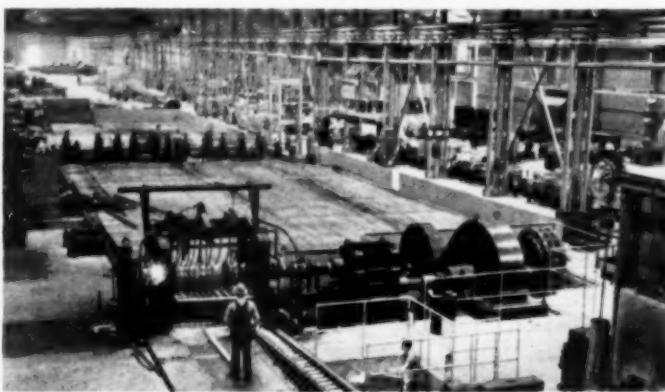
### ALCO-Beaumont Iron Merger

THE BEAUMONT IRON WORKS COMPANY of BEAUMONT, TEXAS, has been formally merged into its parent corporation, AMERICAN LOCOMOTIVE COMPANY.

Beaumont Iron Works now will become an ALCO plant, with the parent company taking over the trade-marks and other legal rights which had belonged to its wholly-owned subsidiary.

One of the oldest manufacturers of

drilling and producing equipment, Beaumont Iron Works was acquired in 1945. While continuing production of oil field products, the company soon became engaged in the repair and maintenance of heat exchangers installed in the many refineries and chemical plants of the Southwest. Later, facilities were installed at Beaumont for the assembly of heat exchangers from standard, stock parts, largely for customers in the Southwest.



REHEATING FURNACE is at the extreme right. Chain conveyors discharge billets from furnace to roller conveyor feeding the breakdown mill. Material then passes on to looping mill stands extending across the floor in center portion of the mill area.

### Reynolds' New Merchant Mill—Sheffield, Ala.

A new merchant mill which has capacity to produce 36 million pounds of aluminum merchant wire, rod and bar products annually has been completed at Sheffield, Ala., at a cost of approximately one and three-quarter million dollars. The facility is now in production and will be operated by REYNOLDS ALLOYS COMPANY, a subsidiary of REYNOLDS METALS COMPANY. It includes 130,000 sq ft of floor space.

A new mill building was erected consisting of one 80 ft and one 60 ft bay, both 880 ft long. The high bay type of construction is employed to facilitate adequate crane service for all operations. The equipment layout is such that the wire or rod products follow a straight line flow from rolling to inspection and shipping of the final product out the far end of the mill. Reynolds' own corrugated aluminum sheet used for all roofing and siding provides a clean modern appearance to the building. This new

mill is completely power ventilated to provide a maximum of air circulation for the comfort of the employees.

The installation of additional drawing equipment more than triples the capacity of the Listerhill plant to produce cold finished merchant products, while the new heat-treating furnace doubles the capacity to produce heat treated products. The net result was to approximately double Reynolds' capacity to produce merchant type products. And by relieving congestion in the structural mill, its capacity to produce large rod and structural shapes was also doubled.

In the new merchant mill, rod products will be produced up to 2.0-inches in diameter, while wire can be furnished down to approximately 0.092-inch in diameter in either coiled or in straightened lengths. A complete line of rectangles, squares, hexagons, angles, and flattened wire can also be produced in much greater quantities than ever before.

### **Prat-Daniel—Florida**

GEORGE F. BEGOON has been appointed director, Southeastern Sales District, by the THERMOBLOC DIVISION of PRAT-DANIEL CORPORATION, South Norwalk, Conn., manufacturer of Industrial Space Heaters.



George F. Begoon

Mr. Begoon has established headquarters in FORT LAUDERDALE, FLORIDA. His district includes North and South Carolina, Georgia, Alabama, and Florida.

From 1946 until 1953, Mr. Begoon was a vice president of the Thermix Corporation, Greenwich, Conn.

Prior to joining Thermix, he spent the greater part of his business career with Westinghouse. Mr. Begoon is a graduate of the Virginia Polytechnic Institute.

### **Anaconda—Ga., Fla.**

ANACONDA WIRE & CABLE COMPANY has announced the transfer of J. H. SAUNDERS from the ATLANTA office as District Manager for the State of Florida with headquarters at 337 First National Bank Bldg., TAMPA, FLA.

GEORGE LEWIS has replaced Mr. Saunders in the Atlanta office at 315 Rhodes-Haverty Bldg., which is headed by MALCOLM J. BLACK as District Manager.

### **Reintjes Appoints Richardson**

THE GEO. P. REINTJES COMPANY, 2517 Jefferson St., KANSAS CITY, Mo., designers and builders of refractory heat enclosures for industry, announces the appointment of N. W. RICHARDSON as representative in Colorado, New Mexico, and West Texas. His headquarters are at the Denver Office, 3860 Galapago St., Denver, Colo.

### **Lift-Slab Project—S. C.**

Largest lift-slab project to date is new 5-story Student Dormitory on the Campus of Clemson College, South Carolina.

General contractors for the construction project, the DANIEL CONSTRUCTION COMPANY of GREENVILLE, S. C. and BIRMINGHAM, ALA., utilized the revolutionary lift-slab method to meet rigid time and cost factors. Concrete for the floors was poured in separate layers at ground level about structural steel columns spaced about 25 ft apart. Floors were then lifted by hydraulic jacks to final height and secured to columns.

Project has introduced several "firsts" in the industry. Vacuum process to remove excess water from freshly poured concrete cut curing time, enabled finishers to begin work within 30 minutes after pouring. Eight thousand square feet of slabs were lifted in unison at rates up to 12 ft per hour. The contractors anticipate savings of one dollar per square foot in building costs.

The Dormitory houses 2000 students and provides a kitchen, dining room and a Student Union. Architects are Lyles, Bissett, Carlisle & Wolff, of Columbia, South Carolina.

**Reprints Available . . . 25c each or 6 for \$1<sup>00</sup>**

## **INSTRUMENTATION TERMS SIMPLIFIED**

**Engineers are having themselves a time with a new language —**

• • •

NEW production concepts and methods of Power and Industrial Instrumentation loom large in the forefront of today's plant design, operation and maintenance. Unfortunately, the very newness that makes these concepts and methods so vital, also causes confusion even among the men who use them most. Due to the continuous changes and additions in this new language—spontaneously invented, in many cases—exact definitions of its new terms are virtually impossible to find.

• • •

RECOGNIZING the need for a more thorough knowledge of this terminology, which very few people actually understand, the editors of SOUTHERN POWER AND INDUSTRY have published an 8-page dictionary of some of the more important instrumentation terms as interpreted by 33 instrumentation experts in all phases of industry. Since publication, major companies have written in to request over 3000 copies.

## **SOUTHERN POWER & INDUSTRY**

806 Peachtree Street N.E.

Atlanta 5, Georgia

Send me . . . copies of your 8-page reprint of INSTRUMENTATION TERMS at 25¢ each or 6 for \$1.00.

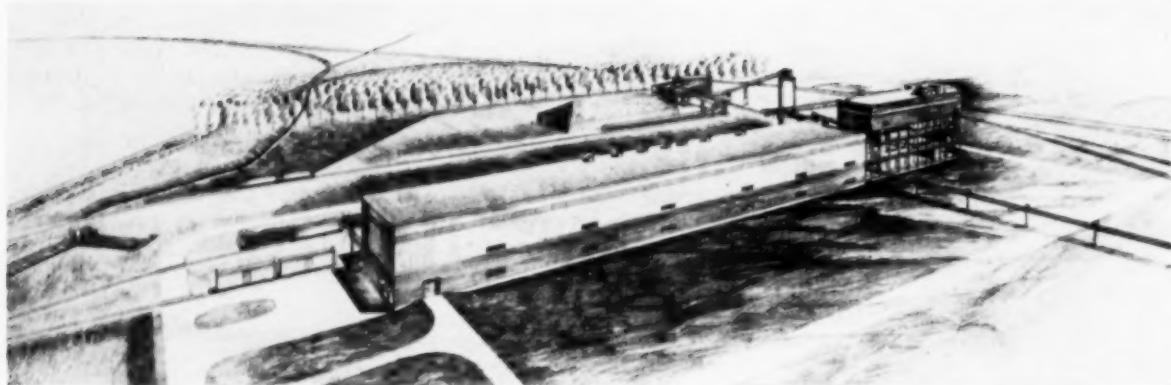
**PAYMENT ENCLOSED \$**

NAME . . . . .

COMPANY . . . . .

ADDRESS . . . . .

CITY . . . . . STATE . . . . .



Crossett Paper Mills' new pulp and board unit will use a large percentage of hardwoods which will be pulped by the neutral sulphite semi-chemical process.

## Crossett Expanding Arkansas Operation

By D. G. MOON

J. E. SIRRINE COMPANY, Engineers  
Greenville, S. C.

THE CROSSETT COMPANIES had their beginning more than fifty years ago as sawmill operators. The Company is now made up of three manufacturing divisions: Crossett Lumber Company, Crossett Chemical Company, and Crossett Paper Mills.

The present kraft pulp and paper

plant was built in 1937, and has grown to its present capacity of 450 tons per day.

With Crossett's large land and timber holdings and its extensive forestry program, it was vitally interested in increasing the utilization of the products from its forests, which grow large quantities of various hardwoods. It was with the use of these hardwoods in mind that the new unit was planned. While the present kraft mill uses only pine, the new mill will use a large percentage of hardwoods which will be pulped by the neutral sulphite semi-chemical process.

After the Crossett organization had conducted research for a number of years in the utilization of hardwoods in paper making, J. E. SIRRINE COMPANY, of Greenville, S. C., was retained as Consultant to assist with the preliminary work of preparing cost estimates, plans, flow sheets, and report prior to final decision to proceed with the project. In July, 1953, Surrine was commissioned to start actual design.

The new unit is being built completely separate from the present kraft mill but will be operated as an integral part of Crossett Paper Mills. The two mills will be connected by pipe lines since the new mill will use a furnish of mixed pine and hardwood pulps in the production of bleached food container board and related products. The initial production will total 150 tons of finished product per day.

### Steam, Power and Water

Steam from the present power plant will be supplied to the hard-

wood mill for all uses, and the fire protection system will be interconnected using the existing 100,000 gallon elevated storage tank for both plants.

The existing kraft mill had already under way the installation of a new bark boiler. The hardwood unit program will necessitate the further addition of water walls to other existing boilers.

Electrical power is to be purchased from Arkansas Power & Light Company, with a tie-in to the power plant at the present kraft mill at 13,800 volts, with primary distribution to unit substations at strategic locations, where it will be stepped down to 440 volts and 2300 volts for motor service.

Water will be supplied from nine wells in the adjoining area and pumped to a cold lime softener to be located at the existing kraft mill. The water from the softener is to be stored in a concrete reservoir and pumped to the new mill for use in process. Part of this water will be diverted and pumped through the condenser of a new evaporator unit to be installed at the kraft mill, from which it will be delivered to a warm water storage tank at the new mill, so as to provide hot water after being pumped through a controlled heat exchanger.

Black liquor from the new mill will be returned to the kraft mill and blended with the kraft liquor ahead of the evaporators. There will also be interconnecting lines for hot and cold water from facilities at the kraft mill to the new mill, and waste water from the new unit will be returned to the old mill for use as cooling water

# CHIMNEYS

## Industrial Waste Burners

AMERICAN  
CHIMNEY CORP.

141 Fourth Ave.  
New York City

### Branches:

Boston, Philadelphia  
Buffalo, Cleveland  
Detroit

for the jet condenser on the evaporators.

Waste from the new mill will be combined with that from the kraft mill before discharge into an impounding basin with an area of 160 acres.

#### Production Facilities

The new unit is to be located southwest of the existing mill and will consist of the following facilities: Wood Yard, Chip Preparation Area, Digester, Refining Washing and Screening, Bleach Plant, Stock Preparation, Machine Room, Finishing and Shipping, Chemical Area, Water Supply and Waste Disposal.

#### Leadbetter Now President of Burgess-Manning Co.

RALPH L. LEADBETTER, DALLAS, TEXAS, has been elected president of BURGESS-MANNING COMPANY, pioneer manufacturers of industrial noise abating equipment. Mr. Leadbetter succeeds Willis L. Manning who has been president since the company was organized in 1944 and who will retain

his position as treasurer and a member of the Board of Directors.

Mr. Leadbetter has been vice president since 1944 and was in charge of the company's Dallas Division since its formation in 1951. The Dallas Division serves the petroleum and petro-chemicals fields. S. G. Paddock, who has been sales manager of the Dallas Division, has been named Dallas Division manager.

#### Koppers' Waste Treatment Plant in Operation—W. Va.

KOPPERS COMPANY'S new waste treatment plant, FOLLANSBEE, W. VA., was put into full-scale operation recently as the company's contribution to a cleaner Ohio River.

Built as an addition to Koppers tar products plant, the new treatment unit now makes possible the removal of 99% of the phenol contained in the tar process water, reducing the phenol content to 0.005% before it is emptied into the river alongside the plant. Before the new unit was built, the process water emptying into the river contained up to 0.3% of tar acids.

Phenol, more commonly known to the layman as carbolic acid, may impart an unpleasant taste to river water treated for use in city water mains even though in such a diluted state that it is entirely harmless to human beings. The three-tenths of one per cent phenol which once was contained in process water from Koppers Follansbee plant was entirely harmless, but the new treatment plant will assure that water placed in the river from the Koppers plant will not develop chemical taste on treatment.

#### Alford Names Polakoff, Tex.

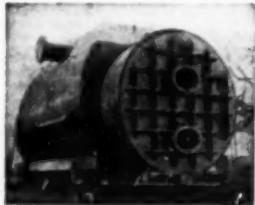
Appointment of EDWARD M. POLAKOFF as a vice-president of ALFORD REFRIGERATED WAREHOUSES, INC., 318 Cadiz Street, DALLAS, TEXAS, has been announced.

Before joining the Alford organization, Polakoff for seventeen years was Southwest district manager for the Grabler Manufacturing Company of Cleveland.

In his new position, Mr. Polakoff will serve as coordinator between the company and its national and local accounts.

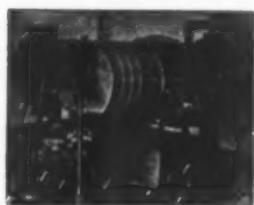


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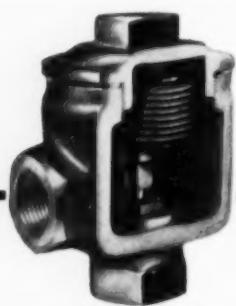
*Free literature on the latest developments in equipment and supplies is offered by leading manufacturers. For your copy, circle the item number on one of the reader service post cards provided on pages 17 and 18.*

**S-1 MATERIALS HANDLING**—Bulletin No. 400, 22 pages—Illustrates and describes specific plant applications of engineered materials handling systems including bulk chemicals, chip-handling in metalworking, drum handling for chemical processing, grain handling, coal, sand, tray elevator, and others. Covers equipment and methods used.—GIFFORD-WOOD COMPANY, Hudson, N. Y.

**S-2 HIGH VOLTAGE SWITCHGEAR**—Bulletin 7004-B, 24 pages—Sections of guide cover features, switchgear components, applications, specifications, and construction data. Illustrated with diagrams and photographs.—I-T-E CIRCUIT BREAKER CO., 19th and Hamilton Sts., Philadelphia 30, Pa.

**S-3 LUBRICATION**—Data Book 54-1, 36 pages—Gives Lubriplate product data. Lists various industries, equipment to be lubricated in each, and the Lubriplate number recommended for each specific application. Illustrated.—LUBRIPLATE DIVISION, FISKE BROTHERS REFINING CO., 129 Lockwood St., Newark 5, N. J.

**S-4 PRESSURE LOSS CALCULATOR**—Slide-Chart Calculator—Quickly estimates pressure drop and indicates proper



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size steam valve needed for any pressures up to 1500 psi. Gives full operating instructions and necessary technical data.—GOLDEN-ANDERSON VALVE SPECIALTY CO., 1259 Ridge Ave., Pittsburgh 33, Pa.

**S-5 FLOAT AND LEVER VALVES**—Catalog No. 107, 16 pages—Valve selection data includes operating pressure, temperature, capacity, construction, dimensions and weights, applications and other information for ordering. Illustrated with equipment photographs and line drawings.—SCHADE VALVE MANUFACTURING CO., 2527-2537 N. Bodine St., Philadelphia 33, Pa.

**S-6 SOLENOID VALVES**—Bulletin 500A, 4 pages—Covers complete line of solenoid valves for automatic or remote control of steam, air, gas, or liquid flow. Includes applications, operation, specifications, design, construction, and prices. Illustrated.—J. D. GOULD COMPANY, 730 E. Washington St., Indianapolis 2, Ind.

**S-7 CAM CLUTCHES**—Catalog C12-54, 4 pages—Describes Series 200 Morse cam clutches for indexing, over-running and backstop machine drive applications. Includes typical installation drawings and complete table of specifications for 7 models of clutches.—MORSE CHAIN COMPANY, 7601 Central Ave., Detroit 16, Mich.

**S-8 RATCHET LEVER HOISTS**—Bulletin 8P, 8 pages—Describes line of ratchet-lever hoists, including both roller and coil-chain models, with capacities ranging from  $\frac{1}{2}$  to 15 tons. Covers features, specifications, and special hooks; illustrates ratchet-pawl construction. Installation photographs.—COFFING HOIST COMPANY, Danville, Ill.

**S-9 DIATOMITE FILTERS**—Bulletin WC-115, 4 pages—Text, photographs, and schematic diagrams show typical applications of Graver diatomite filters and explain how liquid to be treated is passed through a filtering medium consisting of a form of silica known as diatomaceous earth, to result in a high degree of clarification.—GRAVER WATER CONDITIONING CO., 216 West 14th St., New York 11, N. Y.

**S-10 STEAM TRAPS**—Form No. 151, 36 pages—Revised catalog contains specifications and capacities on steam traps, float traps, air release valves and pipe line strainer, as well as new combination float and thermostatic traps. Tells how to calculate condensation loads and select traps for all classes of equipment. Discusses installation and maintenance.—V. D. ANDERSON COMPANY, 1935 West 96th St., Cleveland 2, Ohio.

**S-11 SCAFFOLDS AND LADDERS**—Bulletin G-205H, 8 pages—Guide to selecting the right ladder or scaffold for all plant maintenance operations, including painting and cleaning; electrical work and equipment maintenance; plant repair and maintenance; and special jobs. THE PATENT SCAFFOLDING CO., INC., 38-21 Twelfth St., Long Island City 1, N. Y.

**S-12 STUD WELDING POWER UNIT**—Manual No. 8, Loose-Leaf—Describes Nelwelder Power Unit designed specifically for operation of stud welding equipment and not usable for conventional arc welding. Contains new instructions on how to parallel two units for welding large diameter studs.—NELSON STUD WELDING DIVISION, Gregory Industries, Inc., Lorain, Ohio.

**S-13 ION EXCHANGE**—Booklet IE-9, 24 pages—Explains variations in water treatment processes serving industry, tells how they work, equipment required, and

type of water produced. Discusses fundamentals of softening, dealkalization, and deionization by water treatment based on ion exchange.—ROHM & HAAS COMPANY, Resinous Products Division, Washington Square, Philadelphia 5, Pa.

**S-14 PIPE REPAIRS**—Catalog No. 54, 30 pages—Covers pipe repair clamps, service saddles, valve and babb reseaters, babb seat dressers, pipe benders and babb hickies; for repair of all types of leaks in water, steam, gas, oil, ammonia and brine lines. Photographs and drawings show equipment and applications.—M. B. SKINNER COMPANY, South Bend, Ind.

**S-15 FORK TRUCK EFFICIENCY TEST**—Folder—Includes all necessary information to determine the condition of the fork truck tested and tells when corrective measures are needed.—MERCURY MANUFACTURING CO., 4044 S. Halsted St., Chicago 9, Ill.

**S-16 TAPE COATING**—Catalog, 8 pages—Describes Tapecoat coal tar protective coating in handy tape form to solve corrosion problems in gas and oil lines, transportation applications; water and sewage lines; and in many industrial uses. Illustrated with photographs of specific installations.—THE TAPECOAT COMPANY, Evanston, Ill.

**S-17 INSTRUMENTATION FOR STEAM GENERATION**—Bulletin 9050, 30 pages—A convenient, one source reference for all of the company's products applicable to steam generation, especially useful for plant engineers in selection of instrumentation for modernization of package boilers.—MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, Wayne and Windrim Aves., Philadelphia 44, Pa.

**S-18 LOW VOLTAGE SWITCHGEAR**—Bulletin 200, 36 pages—Manual covers specification and application of low voltage switchgear, including basic types, general features, unit structure, assembly, bus structure, and other important information for laying out switchgear. Illustrated with photographs.—CONTINENTAL ELECTRIC EQUIPMENT COMPANY, Box 1055, Cincinnati 1, Ohio.

**S-19 DEMINERALIZATION**—Bulletin WC-111, 34 pages—Explains chemical and mechanical factors entering into design and operation of demineralization plants for obtaining high quality process water and boiler feedwater from wide range of water supplies and under various operating conditions. Includes flow charts.—GRAVER WATER CONDITIONING CO., 216 West 14th St., New York 11, N. Y.

**S-20 GROUND LOCATING INSTRUMENT**—Booklet 10M454, 8 pages—Describes the Brunt Faultfinder, an instrument used in electrical maintenance, chiefly in industrial plants, for location of grounds in normally ungrounded electrical circuits. Illustrated.—THE PARR MANUFACTURING CORPORATION, 44 Austin St., Newark 5, N. J.

**S-21 GRAPHITIZATION**—Bulletin, 12 pages—Reprint of article on graphitization, a phenomenon of carbon migration in the heat affected zone of welded piping in high temperature service. Discusses methods of correction. Illustrated with photographs and drawings.—EDWARD VALVES, Inc., 1201 West 145th St., East Chicago, Ind.

**S-22 LAYING-UP EQUIPMENT**—Folder, 6 pages—Tells how to safeguard a steam boiler, turbine, or other water using equipment when it is "laid up" during shutdowns of any duration. Cites examples and suggests various methods of protecting equipment.—HALL LABORATORIES, INC., Hagan Bldg., Pittsburgh 30, Pa.

**S-23 ENGINE MAINTENANCE**—Bulletin No. 16, 12 pages—"Air For Your Engine" discusses importance of air supply for any internal combustion engine—gas or diesel. Easy to understand; illustrated with cartoons.—CUMMINS ENGINE COMPANY, INC., Columbus, Ind.

**S-24 HEAVY OIL BURNER**—Bulletin AD-131, 8 pages—Covers design, engineering features, fuel savings and other advantages of the new "4" Hev-E-Oil burner for No. 1 through No. 5 heavy oil in industrial oil heating. Illustrated.—CLEAVERTON BROOKS COMPANY, 326 E. Keefe Ave., Milwaukee 12, Wis.

**S-25 WELDED CHAINS**—Bulletin B, 16 pages—All types of welded chains are cataloged as to working load limits, material diameter, link sizes, finishes, packaging and other data pertinent to the selection and application of welded chains and attachments for materials handling and other industrial uses.—THE MCKAY COMPANY, 342 McKay Bldg., Pittsburgh 22, Pa.

**S-26 RUST PREVENTION**—Bulletin, 4 pages—Describes Ophso, a product which can be applied to rusted surfaces, thereby causing iron oxide to chemically change to iron phosphate, an inert, hard dark gray substance. Suggests use for priming new ferrous and galvanized metals. Illustrated.—RUSTICIDE PRODUCTS COMPANY, 3125 Perkins Ave., Cleveland 14, Ohio.

**S-27 CONTROLS AND SAFETY DEVICES**—Catalog SC-5, 24 pages—Boiler water level controls and safety devices are cataloged, including: boiler water feeders, make-up water feeders for receivers; low water fuel cut-offs; pump controllers; pressure and temperature relief valves; float operated switches; and related items.—McDONNELL & MILLER, INC., 2500 N Spaulding Ave., Chicago 18, Ill.

**S-28 WORK PLATFORMS**—Folder, 6 pages—Describes all-steel portable and stationary platforms custom-fitted to each work requirement. Platforms for large equipment repair, production operations, maintenance, and other uses are included. Design and construction are given. Illustrated.—BALLYMORE COMPANY, Wayne, Pa.

**S-29 WATER GAGES**—Bulletin WG-1812, 29 pages—Covers Yarway boiler water columns and gages, describes major improvements in flat-glass high pressure water gages. Includes round-glass gages for pressures up to 400 psi and flat-glass gages featuring separated-design, floating assembly and inserts and Type "M" illuminators for pressures up to 2500 psi.—YARNALL-WARING, Mermaid Lane, Philadelphia 18, Pa.

## Fire Protection in Florida Utility

(Starts page 52)

this system is located outside the conveyor transfer room door. At the crusher house four 34 gpm (5DP-34) fog heads are applied over the crusher equipment and conveyor transfer points. The control valve for this system is outside the crusher house door. The 5DP-34 fog heads are of the enclosed type with plastic caps to prevent clogging by coal dust.

Additional protection is provided by 1½" hose outlets located throughout the plant and along the coal handling system. On the main operating floors, these hose outlets are located close to exit doors to permit personnel to re-enter the plant and fight a fire if it should ever become necessary to evacuate the building following a serious accident. The hose outlets can also be used by plant personnel for such items as washing down floors, thereby making a separate house service hose outlet system unnecessary. In addition to

an initial cost saving, the continual use of these connections will keep the system clean and free from scale.

Hose lines employed are 1½" as they can be handled by one man in an emergency. It would take at least two men to handle a 2½" line at the pressures involved. The nozzles provided for use with the hose are of two types; a three position "Off-Fog-Solid Stream" type and a two position "Off-Fog" type. The three position nozzle should not be used where the solid stream could come in contact with oil or electrical apparatus.

### Fixed Carbon Dioxide Systems

Metal-enclosed switchgear is not fire proof. Because a fire in this equipment is extremely difficult to combat with portable equipment without demolishing part of the metal enclosure, all 2300 volt and 575 volt switchgear has been equipped with fixed carbon dioxide fire protection systems.

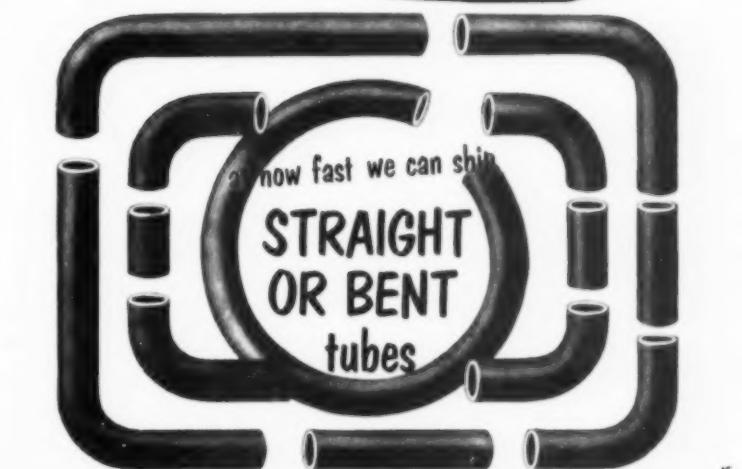
The switchgear for each generating unit is protected by a sys-

tem having a bank of twelve 50 lb CO<sub>2</sub> cylinders. There is a CO<sub>2</sub> discharge nozzle in each compartment of each frame, connected to the cylinders with extra heavy pipe through directional valves. Three hose reel assemblies, each consisting of 75 feet of ¾" hose with cluster type discharge horns, are also connected to the CO<sub>2</sub> cylinder banks through directional valves. They are intended for mopping up operations at the switchgear or for combating oil fires at the turbine oil reservoirs and the turbine oil storage tank.

The twelve cylinders in each bank are so valved and controlled that six cylinders are initially released to flood a designated switchgear group while the other six cylinders act as a reserve or as a supply to the hose reels. The two systems are interconnected so that one bank of cylinders can be used to back up the other. They are manually operated.

The switchgear for the coal handling equipment is located in the crusher house. It is protected by

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an automatically operated system consisting of a bank of six 50 lb CO<sub>2</sub> cylinders and one hose reel assembly. Thermostats in the switchgear release the cylinders automatically on excessive temperature rise. A manual release device is located on the outside of the building, adjacent to the entrance door.

#### Portable Equipment

It was decided to use only two extinguishing agents in the portable equipment, CO<sub>2</sub> and chlorobromomethane (CBM). Both are very effective on fires encountered in a generating station, especially those involving oil and electrical equipment.

The units range in capacity from a 100 lb CO<sub>2</sub> wheeled extinguisher to 15 lb CO<sub>2</sub>, and 1 gallon CBM down to 1 quart CBM. They are located throughout the plant in such a way that the CBM units are readily available for fires in electrical equipment such as motors, switchboards, etc., because this agent is non-conducting and

the extinguisher has good projectional features. The toxic effect of this agent is not too serious. The CO<sub>2</sub> extinguishers are placed in locations where the primary hazards may consist of spill fires involving oil which may cover a large area.

The 15 lb CO<sub>2</sub> and the CBM extinguishers are designed to be discharged in the upright position by means of a squeeze-grip control valve. This will avoid confusion and delay at the outbreak of a fire.

A colored, enameled identification plate is placed at each portable extinguisher.

#### Train Your Personnel

Most fires which have occurred in generating stations have been extinguished with portable equipment. Those cases where fires progressed beyond control were due to lack of effective back-up protection. The first line of defense has been very much improved by the introduction of chlorobromomethane. The best back-up protection yet developed is high pressure water fog.

Where a public fire department is available for assistance, the Underwriters recommend that fire hydrants be incorporated in the plant piping system for connecting their pumper. Two points of connection with 2½" twin outlets are being provided at the Scholz Steam Plant.

The expenditure for complete fire protection at a generating station is a good investment only if the personnel is fully trained in the use of the equipment provided. Periodic fire drills and instruction for taking care of the equipment are essential.

#### V-Belt Drives

(Starts page 62)

belts. The old belts are well stretched. The new belts, being unstretched, will be slightly shorter, and will take considerably more than their proper portion of the load.

V-belts have been in use under test on different types of performance demands for sufficient length

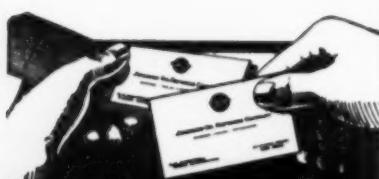
of time that many advances have been made in belts for use under specific conditions. There are V-belts, for instance, which have steel cables running through them. These are employed where maximum pull must be obtained and no stretch allowed to occur in the belts.

#### Special Purpose V-Belts

Special V-belts have been provided for use under very high temperatures. Others are suitable for use in very oily conditions. Still others have been developed where extreme conditions of static are involved. V-belts of so-called double-angle type are available and used by some. Such may be run over one pulley and under another. Consequently, where power must be delivered from a driver to two or three or more pulleys, on an over-and-under principle, using both sides of the belts, double-angle V-belts are sometimes used.

For the most part, V-belts are applied to open-end drives. The standard endless V-belt cannot be applied, in fact, to a closed drive. However, use of V-belt fasteners, as mentioned before, allows application of V-belts to closed-end drives. There is also another solution. That is V-belts made up of links. Links in such V-belts are often made from a number of layers of duck, which have been laminated together with a rubber compound. As made by some manufacturers, each V-belt link of this type is provided with a stud and with one or more holes. The arrangement is such as to allow these belt links to be coupled together in a very short time.

Therefore, the ends of a link-type V-belt can be threaded through a closed-end drive, and coupled together in place. Further, such a belt may be adjusted for length and for tension, independent of any motor position adjustment, simply by adding or removing a link from the belt, as appears necessary. It is possible to keep a stock of link-type V-beltting on reels, in the same way that standard V-beltting is kept, and some have found it advisable to follow this practice.



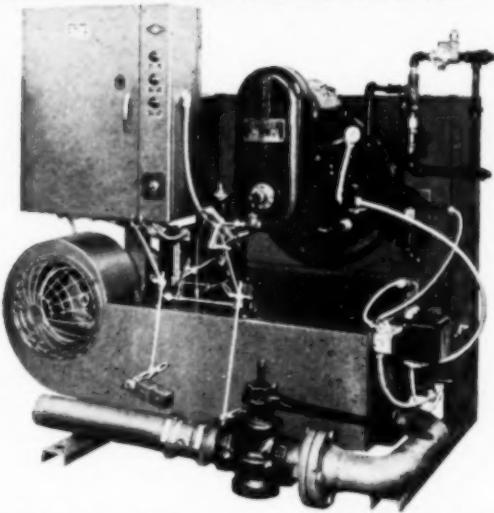
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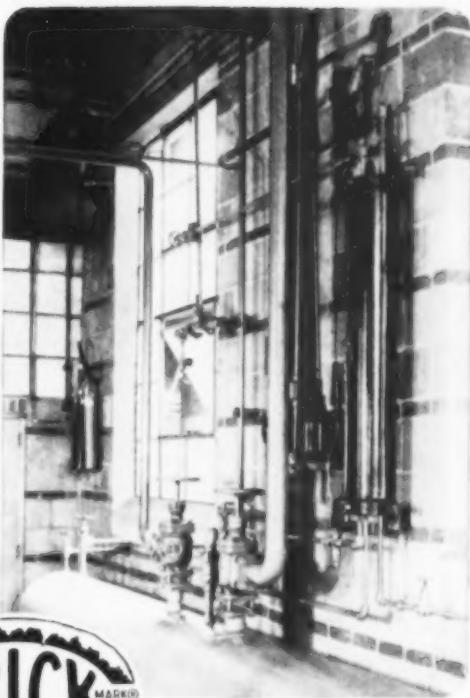
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Catawissa Valve & Fitting Co.	*
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Cooper-Bessemer Corp.	*
Copes-Vulcan Division—Continental Foundry & Machine Co.	26
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Crane Company	42
Custodis Construction Co.	*
Cyclotherm Corp.	*

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DeLaval Steam Turbine Co.	*
Detroit Stoker Co.	*
Diamond Chain Co., Inc.	*
Dowell, Inc.	Fourth Cover
Durametallic Corp.	*

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Electric Wheel Company	*
Emerson Elec. Mfg. Co.	*
Engineer Co.	*
Erie City Iron Works	*
Ernst Water Column & Gage Co.	112
Everlasting Valve Co.	101

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Finnigan, J. J., Co., Inc.	113
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Fiske Bros. Refining Co., Lubriplate Div.	*
Flexible Steel Lacing Co.	*
Fluor Corp., Ltd.	*
Foster Engineering Co.	*
Foster Wheeler Corp.	*
Frick Company	113
Furnas Electric Co.	98

## G

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General Cable Corp.	*
General Coal Co.	*
General Electric Co.	*
Glazer Steel Corp.	112
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Graver Water Conditioning Co.	*
Grinnell Co., Inc.	*
Gulf Oil Corp.	*
Gustin-Bacon Mfg. Co.	*

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## I

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LT-E Circuit Breaker Co.	32 and 33

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Lovejoy Flexible Coupling Co.	*
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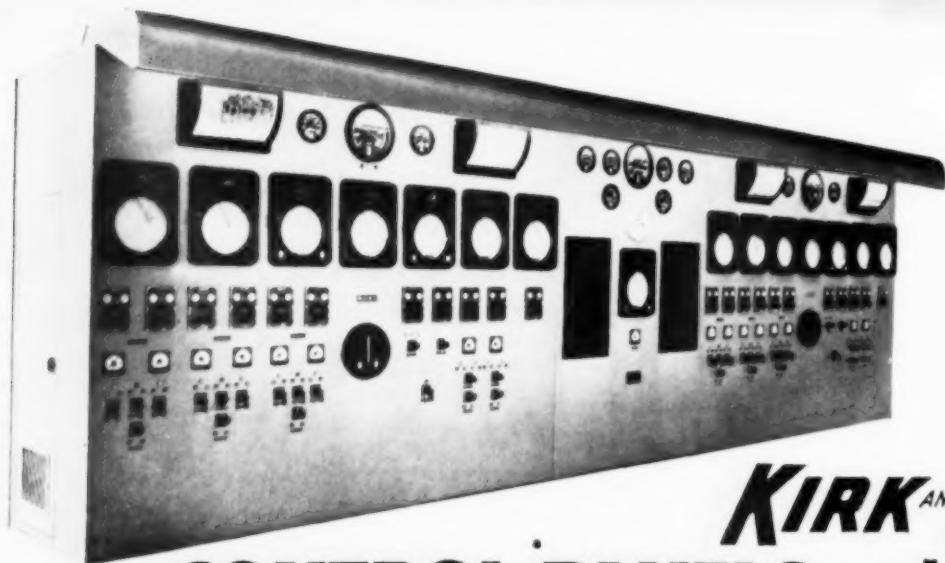
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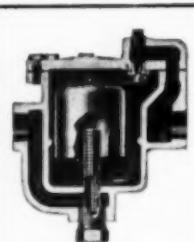
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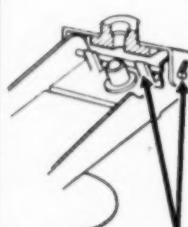


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# JENKINS PRACTICAL PIPING LAYOUTS

72

Diagram by Husley Madeheim,  
Consulting Engineer  
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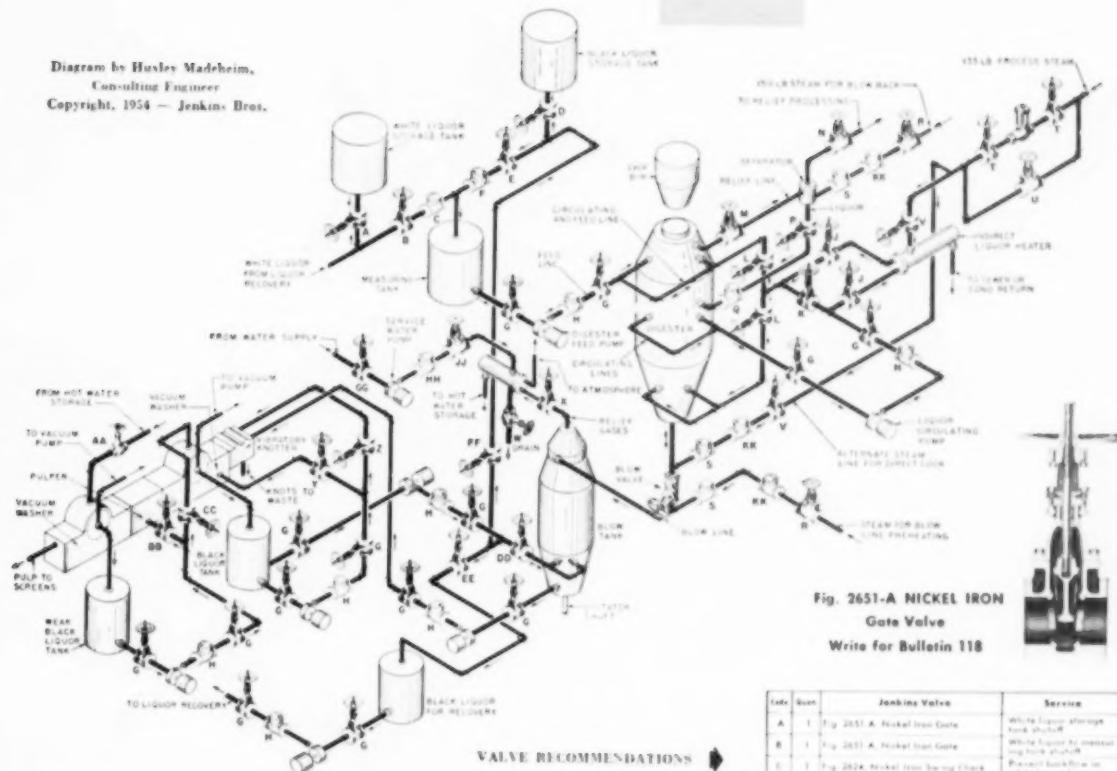


Fig. 2651-A NICKEL IRON  
Gate Valve

Write for Bulletin 118



## How to plan a SULPHATE PULPING PROCESS SYSTEM

**Chemical treatment** begins when chips, conveyed to the digester, are cooked in an alkaline solution of sodium sulphide and caustic soda. The residual spent solution (black liquor) is used in subsequent processing, or is restored to its original state in a chemical recovery cycle. The resultant economy is an important advantage of the sulphate process.

The **digester fluid** is prepared by combining the alkaline solution, either new or recovered (white liquor), with black liquor from the digester discharge, in a predetermined ratio. This blended liquor is pumped into the digester simultaneously with the chips. A liquor circulating pump thoroughly agitates the mixture, and liquor drawn from the center of the digester bypasses the indirect liquor heater and is returned to the bottom of the digester. When the charge is completed, the digester is closed, and the cooking begins.

An **indirect heater** is used for cooking in sulphate pulping, generally, to prevent excessive dilution of the liquor. This layout also shows an alternate steam line for direct cooking.

When the **cooked mixture** is ready for removal, the blow valve is opened and the charge is transferred to the blow

tank where it is washed and cooled.

In a series of **vacuum washers**, the pulp is forced onto revolving drums. As the drum revolves, the pulp is washed by sprays. From the last washer, it goes to the paper making process.

**Black liquor** collected from the first washer is stored for reuse in the digester, pumped to the blow tank for washing the pulp, or pumped to the recovery cycle for conversion to white liquor. This recovery process will be described in a later Jenkins Layout.

Jenkins Nickel Iron Gates and Checks with Stainless Steel Trim are recommended in this system, for valves in contact with black or white liquor.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installation.

To simplify planning, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run*. Jenkins Bros., 100 Park Ave., New York 17, Sold through leading Industrial Distributors everywhere.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Ask for Piping Layout No. 72.

Code	Item	Jenkins Valve	Service
A	1 Fig. 2651-A. Nickel Iron Gate	White Liquor storage tank	
B	1 Fig. 2651-A. Nickel Iron Gate	White Liquor to measuring tank	
C	1 Fig. 2654. Nickel Iron Swing Check	Process backflow to storage tank	
D	1 Fig. 2651-A. Nickel Iron Gate	Black Liquor storage tank	
E	1 Fig. 2651-A. Nickel Iron Gate	Weak Black Liquor to measuring tank	
F	1 Fig. 2652. Nickel Iron Swing Check	Weak Black Liquor to measuring tank	
G	1 Fig. 2651-A. Nickel Iron Gate	Black Liquor line	
H	1 Fig. 2652. Nickel Iron Swing Check	Liquor Return	
I	1 Fig. 2651-A. Nickel Iron Gate	Process backflow	
J	1 Fig. 2651-A. Nickel Iron Gate	Process pump	
K	1 Fig. 2651-A. Nickel Iron Gate	Liquor Transfer	
L	2 Fig. 2651-A. Nickel Iron Gate	Liquor recirculating flow line	
M	1 Fig. 1317. Stainless Steel Globe	Emergency control	
N	1 Fig. 1311. Stainless Steel Valve	Weak liquor flow control	
O	1 Fig. 2651-A. Nickel Iron Gate	Weak liquor from separator	
P	1 Fig. 2651-A. Nickel Iron Gate	Process backflow	
Q	1 Fig. 1311. Stainless Steel Swing Check	Liquor return flow	
R	2 Fig. 1061. Cast Steel Globe	Process liquor flow	
S	2 Fig. 1311. Stainless Steel Swing Check	Process flow line	
T	2 Fig. 1060. Cast Steel Globe	Control bypass stream	
U	2 Fig. 1061. Cast Steel Globe	Liquor line control	
V	1 Fig. 1061. Cast Steel Globe	Blow back vent	
W	1 Fig. 1061. Cast Steel Globe	Blow back vent	
X	1 Fig. 1061. Cast Steel Globe	Blow back vent	
Y	1 Fig. 2651-A. Nickel Iron Gate	Blow back vent	
Z	1 Fig. 2651-A. Nickel Iron Gate	Blow back vent	
AA	1 Fig. 1061. Brass Globe	Control water flow	
BB	1 Fig. 2651-A. Nickel Iron Gate	Brass liquor storage tank	
CC	1 Fig. 2651-A. Nickel Iron Gate	Brass liquor storage tank	
DD	1 Fig. 2651-A. Nickel Iron Gate	Brass liquor storage tank	
EE	1 Fig. 2651-A. Nickel Iron Gate	Brass liquor storage tank	
FF	1 Fig. 2651-A. Nickel Iron Gate	Brass liquor storage tank	
GG	1 Fig. 621-A. I.B.M. Gate	Service water pump	
HH	1 Fig. 624. I.B.M. Swing Check	Process backflow	
II	1 Fig. 613. I.B.M. Globe	Through pump	
RR	3 Fig. 1025. Cast Steel Swing Check	Control water supply	
SS		Steam line check	

**JENKINS**  
VALVES

*Jenkins Bros.*

# MILL SCALE REMOVED CHEMICALLY FROM NEW PLANT EQUIPMENT

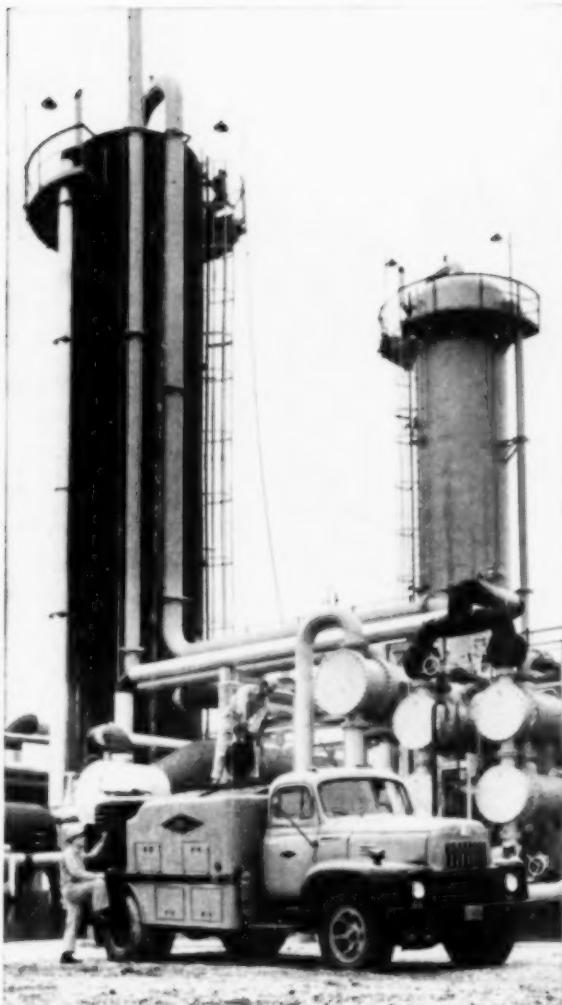
Entire ammonia plant cleaned after erection.

Job done in 4 days, cutting operator's estimated cleaning cost almost 50%.

A new synthetic ammonia plant had just been erected. The operator wanted to remove the mill scale from the entire operating system before the plant was put into production. This would eliminate dangers of product contamination, retarded heat transfer and further corrosion. And once the plant was put into operation, it could stay on stream.

Dowell engineers did the job in just 4 days. They used chemical solvents to remove the mill scale from all equipment in the ammonia, oxygen and lube systems— compressors, after-coolers, intake, discharge, hydraulic and synthesis lines, nitrogen knockouts, synthesis and raschig ring towers, and ammonia bowls. Solvents were applied through regular connections—no dismantling was required.

The operator indicated that Dowell Service saved his company almost 50% over their own estimated cost of removing the scale using mechanical methods.



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Perhaps chemical cleaning can help increase the efficiency of equipment in your plant. For complete information and cost estimates, call your nearest of over 130 Dowell offices—no obligation, of course. If you prefer, write directly to DOWELL INCORPORATED, TULSA 1, OKLAHOMA, Department G-26.



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